BUSINESS APPLICATIONS PROGRAMS

FOR THE TRS-80 MODEL 100 COMPUTER

TERRY KEPNER MARK ROBINSON

BUSINESS APPLICATIONS PROGRAMS

FOR THE TRS-80 MODEL 100 COMPUTER

TERRY KEPNER MARK ROBINSON

Scott, Foresman and Company

Glenview, Illinois

London

To Richard Staron, for starting me along the path to getting this book written.

Terry Kepner

To Wayne Green, who during idle conversation convinced me to subscribe to issue 1 of his new magazine, *Kilobaud Microcomputing*, about these strange new machines called *computers*.

Mark Robinson

ISBN 0-673-18052-2

Copyright © 1985 Scott, Foresman and Company.

All Rights Reserved.

Printed in the United States of America.

Library of Congress Cataloging in Publication Data

Kepner, Terry.

 $60~\rm business$ applications programs for the TRS-80 Model $100~\rm computer.$

Includes index.

1. TRS-80 Model 100 (Computer)—Programming. Business—Data processing. I. Robinson Mark.

2. Business—Data processing. I. Robinson, Mark, 1955— II. Title. III. Title: Sixty business applications programs for the TRS-80 Model 100 computer. HF5548.4.T75K46 1985 650'.028'5425 84-13890 ISBN 0-673-18052-2

1 2 3 4 5 6-KPF-89 88 87 86 85 84

Radio Shack, TRS-80, and TRS-80 Model 100 Portable Computer are registered trademarks of the Tandy Corporation, Fort Worth, Texas.

Notice of Liability

The information in this book is distributed on an "AS IS" basis, without warranty. Neither the author nor Scott, Foresman and Company shall have any liability to customer or any other person or entity with respect to any liability, loss, or damage caused or alleged to be caused directly or indirectly by the programs contained herein. This includes, but is not limited to, interruption of service, loss of data, loss of business or anticipatory profits, or consequential damages from the use of the programs.

Preface

The Model 100 computer is a powerful, portable tool for the business-person on the go. Its built-in text processor, schedule file, address file, and telecommunications program were all designed to give the computer as wide an appeal as possible. Since the computer is aimed at the general market and not just one specific branch, Radio Shack included the BASIC programming language so that people in specific fields could write their own programs, supplementing the built-in programs and giving the owner a customized tool for his or her business.

Unfortunately, most purchasers of the Model 100 computer know nothing about computer programming, and the majority don't want to learn how to program. Instead, they want to concentrate on just using the machine. This is a reasonable approach given the problems of programming proficiently. Learning to program is like learning a new language: it takes time to learn the meaning of the words and the proper methods of stringing them together. If you're trying to do it yourself without an instructor to help, the task becomes Sisyphean. As a general rule, it takes about a year of study and trial-and-error work before the student is familiar enough with the BASIC language to write an efficient and working program in a short amount of time.

This has generated a *program gap*. People are using the computer's built-in programs and searching for knowledgeable programmers to supply the BASIC programs needed for really efficient use of the computer. This doesn't always work, as there are more computers

than good programmers. Hence, many people try to write their own programs, with varying degrees of success.

This program gap led directly to this book. Mark is a business-person-programmer, and I'm a writer-programmer. We decided that the best thing to do to alleviate this lack of business programs was to create a book that supplied them, pooling his knowledge of business, and the attendant formulas, with my writing and programming skills.

Mark wrote each program core, giving the basic input/output code and business formula. I took this core, checked it, cleaned it up, and wrote the text explanation and examples. The result is the best of both worlds. The programs are designed by a businessperson using his knowledge of what a businessperson wants and needs, and the programs are written by a professional writer and programmer so that they are efficient and easy to use and understand.

TERRY KEPNER

Contents

*Includes menu program.

	How to Use This Book*	viii
1	Management Utilities	1
	Ratios	2
	Calculator	20
	Breakeven Unit Analysis	30
	Invoice	36
	Job Quote	49
	Calendar	58
	Days between Dates	62
2	Management Decision Making	65
	Term versus Whole Life Insurance	66
	Time Payment versus Purchase	71
	Total Interest Paid on a Loan	76
	Converting Add-on Interest to Annual Interest	79
	Loan Repayment and Rebate	82
	Purchase versus Lease	86
	Installment Plan Schedule	92
	Capital Asset Pricing Model	96
	Cash Management Model	100
	Price before Sales Tax	104
	Markup (Calculating Retail Price)	107
	Cost before Markup	110
	Cost octore markup	110

	Percentage Markup	113
	Discounted Price	116
	Price before Discount	119
	Profit Margin	122
	Pie Chart	125
	Economic Order Quantity	130
	Bar Chart	133
3	A constant? II almoss	1.41
J	Accountant's Helpers	141
	Depreciation State In a Democratic	142
	Straight-line Depreciation	143
	Sum-of-Year's-Digits Depreciation	146
	Declining-Balance Depreciation	150
	Straight-line versus Declining-Balance	
	Depreciation	155
	Amortization	158
	Average Yield of an Investment	164
	Weighted Average Number of Stock Shares	
	Outstanding	168
4	Time Is Money	175
	Simple Interest—Future Value (PV,I,N = FV)	177
	Compound Interest—Future Value	211
	(PV,I,N = FV)	181
	Other Compound Interest Computations	185
	Compound Interest—Time Period	100
	(PV,I,FV=N)	186
	Compound Interest—Present Value	100
	(FV,I,N = PV)	190
	Compound Interest—Interest Rate	130
	(PV,FV,N=I)	194
		134
	Equivalent Interest—Comparing Compound	107
	Periods $(IR(c) = IR(c))$	197
	Annuities, Ordinary and Due	201
	Ordinary Annuity—Future Value	200
	(PMT,N,I=FV)	202
	Ordinary Annuity—Future Value with	
	Continuous Compounding of Interest,	
	PV Known (PV,N,I = FV)	205
	Ordinary Annuity—Future Value with	
	Continuous Compounding of Interest,	
	PMT Known (PMT, N, I = FV)	208

	Ordinary Annuity—Present Value (PMT,N,I = PV)	211
	Ordinary Annuity—Present Value with Continuous Compounding of Interest, PMT Known (PMT,N,I = PV) Ordinary Annuity—Present Value with	214
	Continuous Compounding of Interest, FV Known (FV,N,I = PV)	217
	Ordinary Annuity—Payment, PV Known (PV,N,I = PMT)	220
	Ordinary Annuity—Payment, FV Known (FV.N.I = PMT)	224
	Ordinary Annuity—Interest Rate, FV Known (PMT,N,FV = I)	227
	Ordinary Annuity—Interest Rate, PV Known (PMT.N.PV = I)	230
	Ordinary Annuity—Number of Payments (PV,PMT,I = N)	233
	Annuity Due—Future Value (I,PMT,N = FV)	237
	Annuity Due—Present Value (I,PMT,N = PV)	242
	Annuity Due—Payment (PV,N,I = PMT)	245
	Annuity Due—Interest Rate, PV Known (PV,PMT,N = I)	249
	Annuity Due—Interest Rate, FV Known (FV,PMT,N = I)	252
5	Programming Utilities	255
_	PACKER	256
	PURGER	261
	Select Bibliography Glossary Index	265 267 273

How to Use This Book

You'll notice that the programs in this book are sequentially numbered. For example, in the Time Is Money chapter (chapter four), the first program's lines are numbered 200 through 240, the second program's line numbers are 250 through 325, the third program's line numbers are 350 through 440, and so forth. (Well, that's not precisely correct: we had to reorganize the programs into a more coherent order after most of the book was already written; thus, the programs aren't in straight-sequence order, but the principle has been kept intact.) This makes it possible for you to mix and match the programs, merging the programs you need most frequently into one large program. This frees up room in the Model 100 directory.

For example, the first ten programs in the Time Is Money chapter occupy only about 10K of RAM; by combining them into one long program you use only one entry space in the directory instead of ten, freeing up the other nine for other programs or data files.

In order to get this merging technique to work, you have to write a short *menu program* that lets you select the particular routine you want when you run the program. A sample menu program is shown below:

10 CLS:PRINT" 1. Simple Interest":PRINT" 2. Compound Interest":PRINT" 3. Equivalent Interest Rates":PRINT" 4. Time Computation":PRINT" 5.

Present value":PRINT" 6. MENU"

20 INPUT"Your Choice"; A\$: A=VAL(A\$):

IFA<10RA>6THEN10

- 30 ONAGOTO 200,250,350,450,550
- 40 MAXFILES=0:CLEAR0:MENU

To make your own menu, just put in the names of the programs, change the 6 in line 20 to match the high number you use, and use the first line number of each program in place of the numbers I used in line 30. The only qualification is that the menu program lines must be numbered between 1 and 199 (that's why the first program starts with line number 200: to leave room for a menu program, if it's needed).

The last choice listed, 6, returns you to the Model 100 menu. The ON...GOTO statement has only five line numbers in it, so by selecting option 6 you skip the ON...GOTO statement, and line 40 is executed. The MAXFILES command removes any input/output buffers that may have been used, freeing up additional memory for other uses. Similarly, the CLEAR also frees up memory.

If you have already typed in the programs as separate units, you can easily merge them together: load each one into BASIC and save it to RAM as a .DO file, type in the menu program in BASIC, and then type MERGE"filename.DO" for each of the program units you saved previously. BASIC will automatically add each one to the program in BASIC. When you're finished, all the programs will have been made into one big program.

For example, if you want the first five programs mentioned in my sample program merged, you would type in the first program, Simple Interest (A1), and then type SAVE"A1.DO". Next, type in the second program, Compound Interest (A2); then type SAVE"A2.DO". Repeat this for the other three programs: Equivalent Interest Rate (A6), Time Computation (A3), and Present Value (A4). When you look at your Model 100 menu you should see all five programs stored as text files: i.e., A1.DO, A2.DO, A3.DO, A4.DO, and A6.DO.

Now go back to BASIC, and type in your menu program, referring to the text files of the programs for the proper starting line numbers to use in the ON . . . GOTO statement. When you're through, type MERGE"A1.DO".

The computer will respond by flashing the message WAIT at the bottom of your display. Each time the WAIT message changes from normal display to reverse or vice versa, one line of your text file has been successfully merged with BASIC. Finally, the display will remove the WAIT message and put OK under your merge command, signifying that BASIC is ready for your next instruction. Type MERGE"A2.DO", and the process will repeat. Keep merging the programs until you are finished.

The only error message you could see is *Direct Statement in File*, which means that one of the lines of your text file does not start with a line number. Simply list your program, and see how far BASIC went before it ran into the error. Then go to your text file, and fix the problem. Return to BASIC, and merge the program again.

Sometimes you might not have enough room for all the programs as .BA files and .DO files, and the bigger program you're trying to make. In that case, just convert and merge the programs one at a time, deleting the .DO file after each successful merge.

Another point you will notice is that all the programs have lines numbered 10000 and 10005. These two lines let you rerun the program or return to the Model 100 menu. The reason they are numbered the same in all the programs is so that, when you merge programs, you don't waste space with needless repetitive code.

Line 10005 is similar to line 40 in the menu program in that it returns you to the Model 100 menu, setting MAXFILES to zero and clearing string space first. To use this with a larger, menudriven program, you'll want to return from the individual program segments to the programs menu, not the Model 100 menu. So, after making—merging—your larger program, edit line 10005, remove the commands MAXFILES=0:CLEAR0:MENU, and replace them with RUN.

This change will fix it so that line 10005 will return you either to the main program menu or to the program segment you just used. The program main menu will have an option to return you to the Model 100 menu.

As you examine the programs in this book, you'll see other routines that are repetitive, with line numbers between 9000 and 9999. These don't need to be changed when merged with a larger program.

You'll also note that occasionally within a program the word REM or the apostrophe (') appears. The text that follows either one of these is a comment only and doesn't affect the operation of the program. You can leave these comments out of programs without affecting them. The comments were put in to make it easier for you to understand how the programs work.

If you want to experiment with the programs, adding, deleting, or just compressing them, we have provided a line number and variable name cross-reference list for each program.

The cross-reference is easy to use. First are the line numbers referred to by GOTO, GOSUB, THEN, and ELSE statements. Next are listed the variable names used by the program, with the line numbers on which they appear. For example, the cross-reference for the first Time Is Money program, Simple Interest, is reproduced below:

Ref			Line N	umbers	
:00200:	240				
:10000:	240				
:I :	215	230			
•	Interes	st rate			
:P :	205	230	235		
•	Princi	pal			
:P\$:	210	215	220	225	235
	Intere	st peri	od		
:T :	225	230	235		
:	Numb	er of i	nterest p	periods	

This says that line 200 is referenced, or *called*, by a command in line 240. Line 10000 is referenced by a command in line 240. The variable name I, storing the interest rate, is used in lines 215 and 230; P, the principal amount, is used in lines 205, 230, and 235. P\$, the interest period, is used in lines 210, 215, 220, 225, and 235. And T, the number of interest periods to calculate, is used in lines 225, 230, and 235.

Knowing which lines are referenced by GOTO, GOSUB, THEN, and ELSE statements, as well as which variable names are in use, where they are used, and what the variables store, makes it easier for someone to modify a program. Continuing with the example of the Simple Interest program: I know, from the cross-reference, that lines 205 through 240 can all be combined into one line without causing a problem. But if I accidentally eliminate line 200 or line 10000, then I will get a *UL error* (undefined line) when the commands in line 240 try to transfer control to the nonexistent line 200 or 10000.

The Simple Interest program can be compressed to look like this:

CLS:PRINTTAB(13)"SIMPLE INTEREST":REM 200 A1 205 PRINT:INPUT"Principal (dollars)";P:PRINT"Interest rate (%per ";P\$;")";:INPUTI;P\$=P\$+"s":PRINT"Number of ";P\$;:INPUTT:P=P+(T*(P*(I/100))):PRINT"Total after":T:P\$:" is ";:PRINTUSING"\$\$#,########";P:GOSUB1000:RUN200 10000 PRINT@281,"Press <ENTER> to continue, M for MENU": 10005 A\$=INKEY\$:IFA\$="M"ORA\$="m" THENMAXFILES=0:CLEAR0:MENUELSEIFA\$<> CHR\$(13)THEN10005ELSERETURN

Further compression (for example, adding line 205 to line 200) isn't practical since the final line would be too long to fit in BASIC, which has a maximum line length of about 240 characters.

As you can see from the above example, compressing a program makes it very hard to read and understand, so why would anyone want to do that? The reason is room. In the Model 100, space is at a premium. The less room a program uses, the more is available for other purposes. In BASIC programming, every time you eliminate a line number you save 4 bytes of memory. Thus, the above compressed program is actually 32 bytes smaller than the uncompressed program. In a machine like the Model 100, 32 bytes is an important amount.

Unfortunately, in the program listings the capital letter O looks like the number 0. Fortunately, only two programs, Invoice and Average Yield of an Investment, use capital O as a variable. For these two programs, refer to the variable cross-reference for the lines using that variable. In the rest of the programs, the capital O is used only in BASIC commands like GOTO and GOSUB. Everywhere else, you use the number 0.

Finally, one important note: if you do decide to modify these programs, don't use the variable A\$. It is already used in the line 10000-10005 subroutine. Since it is in virtually every program, we left it out of the cross-reference list.

1

Management Utilities

If a manager had a toolbox, what do you think he or she would carry in it, bullwhips and pink slips?

Well, perhaps, but far more valuable would be tools like the

programs in this chapter.

The management utilities are highly useful, all-purpose tools intended for anyone in a decision-making position.

RATIOS

All businesses are constantly evaluated by themselves, banks, suppliers, investors, and others. A common method of evaluation used by these people is *ratio analysis*. By comparing relationships of different financial quantities within the business, they can estimate the overall health of the business. For further evaluation, the financial ratios of one business can be compared to the ratios of other businesses in the same industry.

This program asks for information about the company and calculates twelve common and useful ratios: current asset, quick ratio (acid test), debt to total assets, times interest earned, fixed charge coverage, inventory turnover, average collection period, fixed assets turnover, total assets turnover, profit margin on sales, return on total assets, and return on net worth. Once calculated, this information can be changed and the effect on the ratios viewed, yielding valuable information about the company and how it can best be managed.

In fact, we considered this program to be so important that we made it the first program in its chapter and moved the entire chapter to the front of the book (disturbing the overall sequential order of the programs).

An important feature of this program is its ability to manipulate the ratios to find how to make your business as strong as possible. For example, perhaps you can improve your current ratio by selling off inventory at a low price. With the Manipulate Ratio function, you choose the optimum value for the ratio and determine what the appropriate accounts should be. If you're unsure as to the meaning of any of these ratios, you'll find their descriptions in the Glossary at the end of the book.

When you first start the program, it asks for information about the company (sample answers are shown in bold type):

1—Current assets? 1000000

Enter the value of your current assets, or enter 999 if you have previously saved your account totals with the save option of this program (described later).

- 2—Current liabilities? 300000
- 3—Inventory? 1000000
- 4—Total debt? **100000**
- 5—Total assets? **3000000**

6—Profit before taxes? 50000

7—Interest charges? 10000

8—Income available for meeting fixed charges? 300000

9—Fixed charges? 20000

10—Sales? 3000000

11—Fixed charges? 20000

12-Net profit after taxes? 65000

13-Net worth? 3000000

Answer each question with the value, if known. If the information is not available, simply press < ENTER>, and the ratio using that information will not be calculated.

14-Save data? Y

Answer Y or N. If you choose to save the data, a file will be opened called FINDAT.DO. The data can be loaded in again by answering the *Current assets?* prompt with the number 999.

The ratios will be calculated and printed:

1—Current asset	2.33 times
2—Quick ratio (acid test)	-1.00 times
3—Debt to total assets	3.33 %
4—Times interest earned	6.00 times
5—Fixed charge coverage	15.00 times
6—Inventory turnover	3.00 times
F1—Turn page F2—Manig	oulate

At this time, you may press the function key <F1> to see the rest of the ratios.

7—Avg. collection period	24.00 days
8—Fixed assets turnover	7.50 times
9—Total assets turnover	$1.00 ext{ times}$
10—Profit margin on sales	2.17 %
11—Return on total assets	2.17~%
12—Return on net worth	2.17~%
F1—Turn page F2—Ma	inipulate

Press the function key <F2> to manipulate data.

7—Avg. collection period	24.00 days
8—Fixed assets turnover	7.50 times

 $\begin{array}{lll} 9{\rm -Total~assets~turnover} & 1.00~{\rm times} \\ 10{\rm -Profit~margin~on~sales} & 2.17~\% \\ 11{\rm -Return~on~total~assets} & 2.17~\% \\ 12{\rm -Return~on~net~worth} & 2.17~\% \\ {\rm Change} <{\rm D}{\rm >ata~or} <{\rm R}{\rm >atios?} \end{array}$

This allows you either to change the original account data you entered or to change the ratios and have the corresponding data calculated for you. Answer the question with a D. You do not need to press <ENTER>. The screen will display:

1—Current assets = 700000

2—Current liabilities = 300000

3—Inventory = 1000000

4—Total debt = 100000

5—Total assets = 3000000

to change, x = exit, or $\langle ENTER \rangle = pag$?

6—Profit before taxes = 50000

7—Interest charges = 10000

8—Income available for meeting fixed

charges = 300000

9—Fixed charges = 20000

10—Sales = 3000000

to change, x = exit, or $\langle ENTER \rangle = pag$?

11—Receivables = 200000

12—Sales per day = 8333

13—Fixed assets = 400000 14—Net profit after taxes = 65000

15—Net worth = 3000000

to change, x = exit, or $\langle ENTER \rangle = pag$?

To change the value of the net profit after taxes, enter the number 14 and press <ENTER>. The screen will display:

Net profit after taxes = 65000 Enter new value? **70000**

The ratios will be displayed again with new values for the ratios affected by the net profit.

7—Avg. collection period 8—Fixed assets turnover 9—Total assets turnover 1.00 times

10—Profit margin on sales	2.33%
11—Return on total assets	2.33%
12—Return on net worth	2.33%
Change <d>ata or <r>atios?</r></d>	

Press R. The screen will display:

7—Avg. collection period	24.00	days
8—Fixed assets turnover	7.50	times
9—Total assets turnover	1.00	times
10—Profit margin on sales	2.33	%
11—Return on total assets	2.33	%
12—Return on net worth	2.33	%
Enter = page, $0 = \text{exit}$, or ratio	numb	er

Enter the number 7 to change the average collection period.

Avg. collection days =	24.00
Function of:	
Receivables	200000
Sales	3000000
New ratio value? 30.00	

The screen is showing the current value of the ratio and the accounts on which it is based. If, as in the above example, we changed the ratio value to 30.00, the program would calculate a new value for receivables and display:

Avg. collection days	= 30.00	
Function of:		
Receivables	250000	
Sales	3000000	
Change 11 = rcvbles,	10 = sales, 0 = exit?	11

You can now alter the values of sales and receivables to the desired values. Each time you change one function, the other will automatically change so that the ratio remains accurate. When done, press 0 to go back to the ratio display mode. You will notice that, with many ratios, changing one causes others to change.

To make your company appear as strong as possible, find what changes need to be made to your accounts to cause the best possible ratio analysis of your company.

To find the ratios of other companies in the same industry, you

can calculate ratios from their annual reports or from researching ratio analysis studies published by such companies as Moody's and Standard and Poor's.

The file that is created with the save option will be called FINDAT.DO and will store only the values of each account in this manner:

If the save option is used twice, the FINDAT.DO file will be erased and overwritten.

Line Number and Variable Cross-reference

Ref				Line	Numbers
++	7260				
:07370:	7360 7495				
:07440:	7500				
:07475:	7380	7400	7550		
:07485:	7490				
:07495:	7475	7480	7530	7605	7625
•	7670				
:07505:	7475				
	7515				
:07535: :07555:	7350 7520				
197560:	7590				
:07585:	7570	7660	7665	7675	
:07595:	7525				
	7615	7630	7640		
:07645:	7580				
:07680:	7635	7740	7715		
:07685: :07715:	7735 7720	7740	7745		
:07735:	7710				
:07750:	7635				
:07755:	7810	7815	7820	7825	
:07790:	7795				
:07810:	7785				
:07830:	7635	7000	7005		
:07835:	7885	7890	7895		
:07865:	7870 7860				
:07900:	7635				
	7955	7960	7965		
:07935:	7940				
:07955:	7930				
	7635	0000			
:07975:	8025	8030			
:08005:	8010 8000				
:08035:	7635				
:08040:	8090	8095	8100		
:08070:	8075				
:08090:	8065				
:08105:	7635				

:08110:	8160	8165	8170		
	8145	0100	02.0		
	8135				
	7635		0040		
	8230	8235	8240		
:08210:	8215				
:08230:	8205				
:08245:	7635				
:08250:	8300	8305	8310		
		0000	0020		
:08280:	8285				
:08300:	8275				
:08315:	7635				
:08320:	8370	8375	8380		
:08350:	8355				
:08370:	8345				
	7635				
		0445	0.450		
:08390:	8440	8445	8450		
:08420:	8425				
	8415				
:08455:	7635				
:08460:	8510	8515	8520		
:08490:	8495				
:08510:	8485				
:A\$:		7415	7440	7455	7460
		7690		7840	7910
:	7980	8045	8115	8185	8255
•				0103	0233
	8325	8395	8465		
:		SING fie			7.405
:B\$:		7405	7410	7420	7425
:	7430	7445	7450		
•	PRINTUS	SING fie	eld for	mat	
: I :		7625	7630	7635	
•	Keyboar	rd input	t		
:1\$:		7380		7520	7525
:	7615	7650	7655	7660	7665
:	7670	7725	7730	7800	7805
	7875	7880	7945	7950	8015
:					
:	8020	8080	8085	8150	8155
:	8220	8225	8290	8295	8360
:	8365	8430	8435	8500	8505
•		of keybo	pard in		
:RA :	7680	7690	7710	7735	7740
:	7750	7760	7785	7810	7815
•	7820	7830	7840	7860	7885
:	7890	7900	7910	7930	7955
:	7960	7970	7980	8000	8025
•	7 3 0 0	7370	7 3 0 0	3000	0023

	8030 8035 8095 8105 8165 8175 8235 8245 8305 8315 8375 8385 8445 8455	8045 8115 8185 8255 8325 8395 8465	8065 8135 8205 8275 8345 8415 8485	8090 8160 8230 8300 8370 8440 8510
: : : : S	8515 Ratio value 7480 7495 7625 7670	7500	7530	7600
: T :	Current Ratio 7680 7710 7860 7900 8035 8065 8205 8245 8385 8415	7750 7930 8105 8275 8455	7785 7970 8135 8315 8485	7830 8000 8175 8345
: X :	Program flow 7330 7355 7540 7565 7710 7715 7735 7740 7800 7805	marker 7360 7570 7720 7785 7810	7365 7575 7725 7790 7815	7390 7580 7730 7795 7820
	7860 7865 7885 7890 7945 7950 8005 8010 8030 8065 8085 8090	7870 7930 7955 8015 8070 8095	7875 7935 7960 8020 8075 8135	7880 7940 8000 8025 8080 8140
:	8145 8150 8205 8210 8230 8235 8290 8295 8350 8355 8375 8415 8435 8440 8495 8500	8155 8215 8275 8300 8360 8420 8445 8505	8160 8220 8280 8305 8365 8425 8485 8510	8165 8225 8285 8345 8370 8430 8490 8515
:X\$(:	Loop counter		oard in 7365 7705 7800 7925 8060 8195 8290 8410	7570 7725 7850 7945 8080 8200 8335 8430

:		8475	8480	8500				
:		Accoun	Account names					
:)	X (7315	7345	7350	7360	7365		
:		7390	7405	7410	7415	7420		
:		7425	7430	7440	7445	7450		
:		7455	7460	7465	7540	7570		
:		7575	7665	7680	7700	7705		
•		7730	7735	7740	7750	7770		
:		7775	7780	7805	7810	7815		
:		7820	7830	7850	7855	7880		
:		7885	7890	7900	7920	7925		
:		7950	7955	7960	7970	7923		
:		7995	8020	8025	8030			
:		8055	8060	8085	8090	8035		
:		8105	8125	8130		8095		
		8165	8175	8195	8155	8160		
:		8230	8235		8200	8225		
:		8295		8245	8265	8270		
			8300	8305	8315	8335		
•		8340	8365	8370	8375	8385		
•		8405	8410	8435	8440	8445		
•		8455	8475	8480	8505	8510		
:		8515						
:		Account	t data					

Ratios Program

```
7300 CLS:MAXFILES=1:CLEAR500:PRINTTAB(15
"RATIO ANALYSIS": REM RATIO
7305 A$="####.##":B$="####.##"
7310 KEY ON
7315 DIM X(16), X$(16)
7320 DATA"Current assets", "Current liabi
lities", "Inventory", "Total debt", "Total
assets", "Profit before taxes", "Interest
charges"
7325 DATA"Income available for meeting f
          charges", "Fixed charges", "Sale
s", "Recievables", "Sales per day", "Fixed
assets", "Net profit after taxes", "Net wo
rth"
7330 FORX=1T015:READX$(X):NEXT
7335 PRINT"This program will calculate r
atios for given information and allow m
anipulation of the information."
7340 PRINT"Should any information be una
vailable, just press <ENTER>."
7345 PRINTX$(1);:INPUTX(1)
7350 IFX(1)=999 THEN GOTO 7535
7355 FORX=2T015
7360 IF X=12 THEN X(X)=INT(X(10)/360):G0
T07370
7365 PRINTX$(X);:INPUTX(X)
7370 NEXT
7375 INPUT"Save data"; I$
7380 IF I$<>"Y"ANDI$<>"y"THEN7475
7385 OPEN"RAM: FINDAT. DO"FOR OUTPUT AS 1
7390 FORX=1T015:PRINT#1,X(X):NEXT
7395 CLOSE
7400 GOTO 7475
7405 CLS:IFX(1)<>0 AND X(2)<>0 THEN PRIN
                              "::PRINTUSIN
T"1-Current asset
GB$;X(1)/X(2);:PRINT" times"
7410 IFX(1)<>0 AND X(2)<>0 AND X(3)<>0 T
HEN PRINT"2-Quick ratio (acid test) ";:P
RINTUSINGB\$; (X(1)-X(3))/X(2); :PRINT" tim
es"
7415 IFX(4)<>0 AND X(5)<>0 THEN PRINT"3-
Debt to total assets
                         ";:PRINTUSINGA$;
(\chi(4)/\chi(5))*100;:PRINT" %"
```

```
7420 IF X(6) <> OANDX(7) <> OTHENPRINT"4-Tim
es interest earned ";:PRINTUSINGB$;(X(
6)+X(7))/X(7);:PRINT" times"
7425 IF X(9) <> 0 AND X(8) <> 0 THEN PRINT"5
-Fixed charge coverage "::PRINTUSINGB$
:X(8)/X(9)::PRINT" times
7430 IF X(10) <> 0 AND X(3) <> 0 THE NPRINT "6 - In
ventory turnover ";:PRINTUSINGB$;X(
10)/X(3);:PRINT" times"
7435 RETURN
7440 CLS:IF X(11)<>OANDX(10)<>OTHENPRINT
"7 -Avg. collection period "::PRINTUSING
A$; X(11)/INT(X(10)/360):: PRINT" davs"
7445 IFX(10)<>OANDX(13)<>OTHENPRINT"8 -F
ixed assets turnover ";:PRINTUSINGB$;X(
10)/X(13);:PRINT" times"
7450 IFX(10) <> OANDX(5) <> OTHENPRINT"9 -To
tal assets turnover ";:PRINTUSINGB$;X(1
0)/X(5);:PRINT" times"
7455 IFX(14)<>OANDX(10)<>OTHENPRINT"10-P
rofit margin on sales ";:PRINTUSINGA$;(X
(14)/X(10))*100::PRINT" %"
7460 IFX(14)<>OANDX(5)<>OTHENPRINT"11-Re
turn on total assets ";:PRINTUSINGA$;(X(
14)/X(5))*100;:PRINT" %"
7465 IFX(14)<>OANDX(15)<>OTHENPRINT"12-R
eturn on net worth ";:PRINTUSINGA$;(X
(14)/X(15))*100;:PRINT" %"
7470 RETURN
7475 KEY ON:ON KEY GOSUB 7495,7505
7480 S=0:GOSUB 7495
7485 PRINT@280, "F1-Turn page F2-manipul
ate
7490 GOTO 7485
7495 IF S=0 THEN S=1: GOSUB 7405:RETURN
7500 IF S=1 THEN S=0:GOSUB 7440:RETURN
7505 KEY (2) OFF
7510 PRINT@280, "Change <D>ata or <R>atio
s?
7515 I $= INKEY$: IF I $= ""THEN 7515
7520 IF I$="D"ORI$="d"THENGOTO7555
7525 IFI$="R"ORI$="r"THEN GOTO 7595
7530 KEY ON:S=0:GOSUB 7495:RETURN
7535 OPEN"RAM: FINDAT. DO"FOR INPUT AS 1
7540 FORX=1T015:INPUT#1.X(X):NEXT
7545 CLOSE
```

```
7550 GOTO 7475
7555 KEY(1)0FF
7560 CLS
7565 FORX=1T015
7570 IFX=12 THENPRINTX;"-";X$(X);"=";INT
(\chi(10)/360):G0T07585
7575 PRINTX:"-":X$(X);"=";X(X)
7580 IF X/5=INT (X/5) THE NGOT 07645: CLS
7585 NEXT
7590 GOTO7560
7595 KEY OFF
7600 S=0
7605 CLS:GOSUB 7495
7610 PRINT@280, "Enter=page, O=exit, or r
atio number ";
7615 INPUTI$: I = VAL(I$): IF I$ = CHR$(114) THE
NGOT07605
7620 CLS
7625 IF I=O THEN KEY ON:S=O:GOSUB7495:RE
TURN
7630 IFI<1 OR I>12 THEN 7605
7635 ON I GOSUB 7680,7750,7830,7900,7970
 ,8035,8105,8175,8245,8315,8385,8455
7640 GOTO 7605
7645 PRINT@280, "# to change, x=exit, or
 <ENTER>=page";
 7650 I$=""
 7655 PRINT@315, "";: INPUTI$: CLS:
 7660 IF VAL(I$)=12 THEN CLS:PRINT:PRINT"
 Sales per day is a function of total
 sales.":PRINT@280, "Press <ENTER> to cont
 inue"::INPUTI$:GOTO7585
 7665 IFVAL(I$)>0 ANDVAL(I$)<16THENPRINT:
 PRINTX$(VAL(I$)); "="; X(VAL(I$)): PRINT@28
 O, "Enter new value
   ";:PRINT@298,"";:INPUTX(VAL(I$)):CLS:G
 OT07585
 7670 IFI$="x"ORI$="X"THEN KEY ON:S=0:GOS
 UB7495:RETURN
 7675 CLS:GOT07585
 7680 T=0:RA=X(1)/X(2)
 7685 CLS
 7690 PRINT"Current asset=";:PRINT@28,"";
 :PRINTUSINGA$;RA
 7695 PRINT:PRINT"function of:"
 7700 PRINTX$(1);:PRINT@148,X(1)
```

```
7705 PRINTX$(2);:PRINT@188,X(2)
7710 IFT=0 THEN T=1:PRINT@240, "New ratio
 value";:INPUT RA:X=1:GOTO7735
7715 PRINT@240, "Change 1=Assets 2=Liabil
ities O=Exit";:INPUTX:IFX=OTHEN RETURN
7720 IF X>2THEN7715
7725 PRINT@280, "New value for ";:PRINTX$
(X);:INPUTI$:
773.0 X(X) = VAL(I\$)
7735 IFX=1THEN X(2)=INT(X(1)/RA):GOTO 76
85
7740 IFX=2THEN X(1)=INT(X(2)*RA):GOTO768
7745 GOTO 7685
7750 T=0:RA=(X(1)-X(3))/X(2)
7755 CLS
7760 PRINT"Quick ratio (acid)=";:PRINT@2
8, "";: PRINTUSINGA$; RA
7765 PRINT:PRINT"function of:"
7770 PRINTX$(1);:PRINT@148,X(1)
7775 PRINTX$(2);:PRINT@188,X(2)
7780 PRINTX$(3)::PRINT@228,X(3)
7785 IFT=0 THEN T=1:PRINT@240."New ratio
 value";:INPUT RA:X=1:GOTO7810
7790 PRINT@240, "Change 1=Ast. 2=Liab. 3=
Inv. O=Exit";:INPUTX:IFX=OTHENRETURN
7795 IFX>3THEN7790
7800 PRINT@280, "New value for ";:PRINTX$
(X);:INPUTI$
7805 \times (X) = VAL(I\$)
7810 IFX=1THENX(2)=INT((X(1)-X(3))/RA):G
OTO 7755
7815 IFX=2THENX(3)=INT(X(1)-(RA*X(2))):G
0T07755
7820 IF X = 3THENX(1) = INT((RA*X(2)) + X(3)) : G
OT07755
7825 GOTO7755
7830 T=0:RA=X(4)/X(5)
7835 CLS
7840 PRINT"Debt to total assets=";:PRINT
@28, "";: PRINTUSINGA$; RA*100; : PRINT"%"
7845 PRINT:PRINT"function of:"
7850 PRINTX$(4);:PRINT@148,X(4)
7855 PRINTX$(5);:PRINT@188,X(5)
7860 IFT=0 THEN T=1:PRINT@240,"New ratio
```

```
value %";:INPUT RA:RA=RA/100:X=4:GOTO78
85
7865 PRINT@240, "Change 4=Debt 5=Assets 0
=Exit";:INPUTX:IFX=OTHEN RETURN
7870 IFX<>4ANDX<>5THEN7865
7875 PRINT@280. "New value for ";:PRINTX$
(X)::INPUTI$:
7880 X(X) = VAL(I\$)
7885 IFX=4THEN X(5)=INT(X(4)/RA):GOTO 78
35
7890 IFX=5THEN X(4)=INT(X(5)*RA):GOTO783
7895 GOTO 7835
7900 T=0:RA=(X(6)+X(7))/X(7)
7905 CLS
7910 PRINT"Times interest earned=";:PRIN
T@28."";:PRINTUSINGA$;RA
7915 PRINT:PRINT"function of:"
7920 PRINTX$(6);:PRINT@148,X(6)
7925 PRINTX$(7);:PRINT@188,X(7)
7930 IFT=0 THEN T=1:PRINT@240,"New ratio
 value"::INPUT RA:X=6:GOTO7955
7935 PRINT@240, "Change 6=Profit 7=Intere
st O=Exit"::INPUTX:IFX=OTHEN RETURN
7940 IF X<6ANDX>7THEN7935
7945 PRINT@280, "New value for ";:PRINTX$
(X)::INPUTI$:
7950 X(X) = VAL(I\$)
7955 IFX=6THEN X(7)=INT(X(6)/(RA-1)):GOT
0 7905
7960 IFX=7THEN X(6)=INT(X(7)*(RA-1)):GOT
07905
7965 GOTO 7905
7970 T=0:RA=X(8)/X(9)
7975 CLS
7980 PRINT"Fixed charge coverage=";:PRIN
T@28,"";:PRINTUSINGA$;RA
7985 PRINT:PRINT"function of:"
7990 PRINT"Income available";:PRINT@148,
X(8)
7995 PRINTX$(9);:PRINT@188,X(9)
8000 IFT=0 THEN T=1:PRINT@240, "New ratio
 value"::INPUT RA:X=8:GOTO8025
8005 PRINT@240. "Change 8=Profit 9=Intere
```

st O=Exit"::INPUTX:IFX=OTHEN RETURN

```
8010 IF X<8ANDX>9THEN8005
8015 PRINT@280, "New value for ";:PRINTLE
FT$(X$(X),17);:INPUTI$:
8020 X(X) = VAL(IS)
8025 IFX=8THEN X(9)=INT(X(8)/RA):GOTO 79
75
8030 IFX=9THEN X(8)=INT(RA*X(9)):GOT0797
8035 T=0:RA=X(10)/X(3)
8040 CLS
8045 PRINT"Inventory turnover=";:PRINT@2
8.""::PRINTUSINGA$;RA
8050 PRINT:PRINT"function of:"
8055 PRINTX$(10);:PRINT@148,X(10)
8060 PRINTX$(3);:PRINT@188,X(3)
8065 IFT=0 THEN T=1:PRINT@240."New ratio
 value"::INPUT RA:X=10:GOTO8090
8070 PRINT@240."Change 10=Sales 3=Invent
ory O=Exit"::INPUTX:IFX=OTHEN RETURN
8075 IF X<>3ANDX<>10THEN8070
8080 PRINT@280, "New value for ";:PRINTX$
(X)::INPUTI$:
8085 \times (X) = VAL(IS)
8090 IF x = 10THEN x(3) = INT(x(10)/RA): GOTO
8040
8095 IFX=3THEN X(10)=INT(X(3)*RA):GOTO80
40
8100 GOTO 8040
8105 \text{ T}=0:RA=INT(X(11)/(X(10)/360))
8110 CLS
8115 PRINT"Avg. Collection days=";:PRINT
@28.""::PRINTUSINGA$;RA
8120 PRINT:PRINT"function of: "
8125 PRINTX$(11);:PRINT@148,X(11)
8130 PRINTX$(10);:PRINT@188,X(10)
8135 IFT=0 THEN T=1:PRINT@240,"New ratio
 value";:INPUT RA:X=10:GOTO8160
8140 PRINT@240."Change 11=Rcvbles. 10=Sa
les O=Exit"::INPUTX:IFX=OTHEN RETURN
8145 IF X<>11ANDX<>10THEN8140
8150 PRINT@280, "New value for ";:PRINTX$
(X)::INPUTI$:
8155 \times (X) = VAL(I\$)
8160 IF x = 11 THEN x(10) = INT((x(11) * 360)/RA
):GOTO 8110
```

```
8165 IF X=10 THEN X(11)=I NT((X(10)*RA)/360
):GOTO8110
8170 GOTO 8110
8175 T=0:RA=X(10)/X(13)
8180 CLS
8185 PRINT"Fixed asset turnover=";:PRINT
@25,""::PRINTUSINGA$;RA;:PRINT" times"
8190 PRINT:PRINT"function of:"
8195 PRINTX$(10);:PRINT@148,X(10)
8200 PRINTX$(13);:PRINT@188,X(13)
8205 IFT=0 THEN T=1:PRINT@240."New ratio
 value %"::INPUT RA:X=10:G0T08230
8210 PRINT@240, "Change 10=Sales 13=Asset
s O=Exit"::INPUTX:IFX=OTHEN RETURN
8215 IFX<>10ANDX<>13THEN8210
8220 PRINT@280. "New value for ";:PRINTX$
(X)::INPUTI$:
8225 \times (X) = VAL(IS)
8230 IFX=10THEN X(13)=INT(X(10)/RA):GOTO
 8180
8235 IFX=13THEN X(10)=INT(X(13)*RA):GOTO
8180
8240 GOTO 8180
8245 T=0:RA=X(10)/X(5)
8250 CLS
8255 PRINT"Total asset turnover=";:PRINT
@25,"";:PRINTUSINGA$;RA:PRINT" times"
8260 PRINT:PRINT"function of:"
8265 PRINTX$(10);:PRINT@148,X(10)
8270 PRINTX$(5);:PRINT@188.X(5)
8275 IFT=0 THEN T=1:PRINT@240,"New ratio
 value %"::INPUT RA:X=10:GOT08300
8280 PRINT@240."Change 10=Debt 5=Assets
O=Exit"::INPUTX:IFX=OTHEN RETURN
8285 IFX<>10ANDX<>5THEN8280
8290 PRINT@280, "New value for ";:PRINTX$
(X)::INPUTI$:
8295 \times (X) = VAL(IS)
8300 IFX=10THEN X(5)=INT(X(10)/RA):GOTO
8250
8305 IFX=5THEN X(10)=INT(X(5)*RA):GOTO82
50
8310 GOTO 8250
8315 T=0:RA=X(14)/X(10)
8320 CLS
```

```
8325 PRINT"Profit margin on sales=";:PRI
NT@27, "";:PRINTUSINGA$; RA*100;:PRINT" %"
8330 PRINT:PRINT"function of:"
8335 PRINTX$(14);:PRINT@148,X(14)
8340 PRINTX$(10);:PRINT@188,X(10)
8345 IFT=0 THEN T=1:PRINT@240."New ratio
 value %"::INPUT RA:RA=RA/100:X=14:GOT08
370
8350 PRINT@240."Change 14=Profit 10=Sale
s O=Exit"::INPUTX:IFX=OTHEN RETURN
8355 IFX<>14ANDX<>10THEN8350
8360 PRINT@280, "New value for ";:PRINTX$
(X)::INPUTI$:
8365 X(X) = VAL(IS)
8370 IF X = 14THENX(10) = INT(X(14)/RA):GOTO
8320
8375 IF X = 10THENX(14) = INT(X(10) * RA) : GOTO
8320
8380 GOTO 8320
8385 T=0:RA=X(14)/X(5)
8390 CLS
8395 PRINT"Return on total assets=";:PRI
NT@28, "";:PRINTUSINGA$;RA*100;:PRINT"%"
8400 PRINT:PRINT"function of:"
8405 PRINTX$(14);:PRINT@148,X(14)
8410 PRINTX$(5)::PRINT@188,X(5)
8415 IFT=0 THEN T=1:PRINT@240."New ratio
 value %"::INPUT RA:RA=RA/100:X=14:GOTO8
440
8420 PRINT@240, "Change 14=Profit 5=Asset
s O=Exit";:INPUTX:IFX=OTHEN RETURN
8425 IFX<>14ANDX<>5THEN8420
8430 PRINT@280, "New value for ";:PRINTX$
(X);:INPUTI$:
8435 \times (X) = VAL(I\$)
8440 IF X = 14THENX(5) = INT(X(14)/RA):GOTO 8
390
8445 IFX=5THENX(14)=INT(X(5)*RA):GOTO 83
90
8450 GOTO 8390
8455 T=0:RA=X(14)/X(15)
8460 CLS
8465 PRINT"Return on net worth=";:PRINT@
28."";:PRINTUSINGA$;RA*100;:PRINT"%"
8470 PRINT:PRINT"function of:"
8475 PRINTX$(14);:PRINT@148,X(14)
8480 PRINTX$(15);:PRINT@188,X(15)
```

```
8485 IFT=0 THEN T=1:PRINT@240, "New ratio
 value %";:INPUT RA:RA=RA/100:X=14:GOTO8
510
8490 PRINT@240, "Change 14=Profit 15=Net
worths O=Exit";:INPUTX:IFX=OTHEN RETURN
8495 IFX<>14ANDX<>15THEN8490
8500 PRINT@280, "New value for ";:PRINTX$
(X)::INPUTI$:
8505 X(X) = VAL(I\$)
8510 IF X = 14THENX(15) = INT(X(14)/RA):GOTO
8460
8515 IF X = 15THENX(14) = INT(X(15) * RA) : GOTO
8460
8520 GOTO 8460
```

CALCULATOR

This program is a useful, flexible, business-oriented calculator. Its primary function is data storage in seven namable memories that are always in view. Adding up seven columns of figures in a spread sheet becomes simple with this program.

There are two types of calculators: *linear* and *algebraic*. Linear calculators expect entries like this:

123 - 23

with the answer printed immediately afterward:

100

Algebraic calculators expect entries like this:

123 +

23-

Again, the answer, of course, is 100.

This calculator works either way. The Calculator program starts up ready to go: simply begin putting in your figures however you please.

There are four significant sections on the calculator screen:

- **1.** The *box*. In the upper left-hand side of the screen is a 15-character display. This will hold the current totals.
- 2. Directly to the left of the box is a space for the mathematical operator currently in use. It will hold the signs +, -, ×, and / during addition, subtraction, multiplication, and division, respectively.
- 3. The *entry line* is in the lower left-hand part of the display. It is preceded by the symbols = >. The numbers you enter will appear here.
- 4. The *memory storage section* is on the right-hand side of the screen. The memory modules, initially named M0, M1, M2, M3, M4, M5, and M6, and their contents are displayed.

To put a number in the box, either press one of the arithmetic operators (*, \times , +, -, =, /, r, or <GRPH>r), or press <ENTER>.

Press the LABEL function key. The bottom line of the screen will display:

Stor Rell Sum Pntr Clr ClrM MNam Quit

These are your choices for manipulating the numbers you're typing into the calculator. Here's what the various functions are:

Stor (Store) This is used to store the contents of the box to memory. When F1 is pressed, the entry line will display:

Stor #?

Enter the number of the memory module in which you would like the data stored. The designated memory number will now reflect the new data.

Rell (Recall) This will bring data from the memory to the box for calculation. When the F2 key is pressed, the entry line will display:

Rell #?

Press the number of the memory module that you wish to recall.

Sum This will add the number in the box to the specified memory number. When the F3 key is pressed, the entry line will display:

Sum #?

Enter the number of the memory to which the number in the box is to be added.

Pntr (Printer) When the F4 key is pressed, all entries will be printed out on your printer, if it's connected and turned on. Pressing F4 again will cause the printing to stop. If the printer is off or not connected, the program will freeze until the printer is on and connected.

- Clr (Clear) When the F5 key is pressed, the box will clear, and a zero will be displayed.
- ClrM (Clear Memory) When the F6 key is pressed, all the memories will be cleared and their values set to zero. All data is lost. The value in the box, if any, will not be affected.
- MNam (Memory Name) This allows you to rename the memories. This can be used to remind you what information you are storing in each of the seven memories. When the F7 key is pressed, the entry line will display:

MNam #?

Enter the memory number you wish changed. The entry line will display:

New Name?

Enter the name that you want to appear instead of the M0-M6 labels that appear on initial program use. Only the first 5 characters of the name you enter will be used, and the new memory name will be preceded by the memory number. For example, if you change the name of memory module 2 to Expenses, then the name will appear as 2Expenses.

Quit When the F8 key is pressed, the entry line will display the question:

Save totals and memory names (Y/N)?

There is no need to press <ENTER> after pressing a Y or N. If you answer Y, the entry line will display:

Filename?

Answer the question. If your answer is more than 6 characters, any additional characters will be ignored. A file will then be created that contains the amount in the box, the memory names, and the amounts stored in the memories. The entry line will display:

Quit (Y/N)?

If you are not done, answer the question with N; otherwise, your menu will be displayed. When you Quit, your function keys will be restored to those with which the computer was originally delivered, not those you last used.

Calculations

The acceptable calculation operators are:

```
Multiplication
* or ×
                 Division
                 Exponentiation (<SHIFT>6)
                 Square root
<GRPH>r
                 Addition
                 Subtraction
= or < ENTER >
                 Equals
```

```
Ref
                               Line Numbers
+----+
:05310: 5310
:05370: 5490
:05450: 5525
                 5555
                        5730
:05490: 5360
                 5620
                        5640
                                5660
                                        5670
         5750
                5780
:05495: 5525
                5530
                        5555
                                5730
                                        5800
:05500: 5610
:05505: 5505
                5520
:05560: 5555
:05565: 5555
:05570: 5555
:05575: 5555
:05580: 5555
:05585: 5555
:05590: 5555
:05595: 5535
:05605: 5600
:05625: 5600
                5630
:05645: 5600
                5650
:05665: 5600
:05675: 5785
:05680: 5680
:05730: 5600
:05735: 5600
:05755: 5600
                5760
:05785: 5600
:05790: 5790
:05800: 5540
:05805: 5795
:05810: 5340
:05820: 5825
:05830: 5820
: B
      : 5810
                5830
        Function key decode operator
: E
      : 5810
                5820
                        5830
        Function key decode operator
      : 5530
                5550
                        5555
        Operator type
:F1$
    : 5325
                5520
                       5550
```

```
acceptable calculation symbols.
: GT
         5450
                 5475
                         5525
                                 5560
         5570
                 5575
                         5580
                                 5585
                                         5615
         5635
                 5655
                         5720
                                 5730
         'Box' value.
: GT $
       : 5450
                 5455
                         5460
                                 5465
                                         5480
         The fifteen most significant
         digits of the 'box' value.
: I $
       : 5310
                 5315
                         5505
                                 5520
                                         5530
         5555
                 5680
                         5685
         Contains the character entered.
: K$
                 5535
                         5805
                                 5820
         Holds the function key labels.
:
: L
       : 5480
                 5550
                         5665
         Lineprint flag
: L $
       : 5830
         Function key declaration
: M$
       : 5330
                 5350
         Holds the original memory names
:M$(
       : 5350
                 5410
                         5415
                                 5710
                                         5775
:
         Memory names
: M(
       : 5425
                 5615
                         5635
                                 5655
                                         5710
         5740
         Memory values
:MT$
       : 5425
                 5430
                         5435
                                 5440
         Nine most significant
         digits of the memory value.
: S
       : 5315
                 5510
                         5790
         =1 for sound, =0 for none
:TI$
       : 5500
                 5520
                         5530
                                 5535
                                         5545
         5605
                 5625
                         5645
                                 5755
         Contains entry line input
:TT
       : 5545
                 5550
                         5560
                                 5565
                                         5570
         5580
:
                 5585
         Value entered on the entry line.
: U
       : 5515
                 5520
                         5540
          = 1 if user just entered a cal-
          culation symbol.
      : 5345
: X
                 5350
                         5390
                                 5395
                                         5400
         5405
                 5410
                         5415
                                 5425
                                         5520
         5525
                 5530
                         5555
                                 5595
                                         5600
         5605
                 5610
                         5615
                                 5625
                                         5630
         5635
                 5645
                         5650
                                 5655
                                         5705
         5710
                 5735
                         5740
                                 5755
                                         5760
        5775
                 5815
```

: calculation symbol position :X\$: 5690 5695 5700 5765 5770

5775 5790 5795

: Filename :X1 : 5535 5595

: . Miscellaneous variable

+----+

Calculator Program

```
5300 ' calculator
5305 CLS:PRINT@175, "Sound (Y/N)";
5310 I $ = I N K E Y $ : I F I $ = " " T H E N 5310
5315 IFI$="Y"ORI$="y"THENS=1:SOUND16383.
5:ELSES=0
5320 CLS
5325 F1$="*x/^"+CHR$(137)+"+-="+CHR$(13)
5330 M$="MOM1M2M3M4M5M6"
5335 K$="Stor #/Rcll #/Sum # /Pntr "+CHR
$(13)+"/Clr "+CHR$(13)+"/ClrM "+CHR$(13
)+"/MNam #/Quit "+CHR$(13)+"/"
5340 GOSUB5810
5345 FORX=0T06
5350 M$(X)=MID$(M$,(X*2)+1,2)
5355 NEXT
5360 GOTO5490
5365 END
5370 CLS
5375 PRINT@1, CHR$ (240); STRING$ (17, CHR$ (2
41)); CHR$(242);
5380 PRINT@41, CHR$(245); STRING$(17, CHR$(
32)); CHR$(245);
5385 PRINT@81, CHR$(246); STRING$(17, CHR$(
241)); CHR$(247)
5390 FORX=1T03
5395 NEXTX
5400 FORX=0T06
5405 \text{ PRINT@}((x*40)+20), CHR$(245);
5410 IFLEN(M$(X))<6 THEN M$(X)=M$(X)+STR
ING$(6-LEN(M$(X))," ")
5415 PRINTM$(X);
5420 PRINT"=";
5425 MT$=STR$(M(X))
5430 IFLEN(MT$)>9THENMT$=LEFT$(MT$,9)
5435 IFLEN(MT$)<9THENMT$=STRING$(9-LEN(M
T$),"")+MT$
5440 PRINTMT$:
5445 NEXT
5450 GT$=STR$(GT)
 5455 IFLEN(GT$)>15THENGT$=LEFT$(GT$,15)
5460 IFLEN(GT$)<15THENGT$=STRING$(15-LEN
 (GT\$),"")+GT$
 5465 PRINT@42,GT$;
 5470 PRINT@40." ";
```

```
verflow";:ELSEPRINT@122,"
5480 IFL=1THENLPRINT"=":GT$
5485 RETURN
5490 GOSUB5370
5495 PRINT@240,"=>
                                 "::PRINT
@242,"";
5500 TI$=""
5505 I $= INKEY $: IF I $= ""THEN 5505
5510 IFS=1THENSOUND16383,5
5515 U=0
5520 X=INSTR(1,F1$,I$):IFX=OTHENPRINTI$;
:TI$=TI$+I$:GOTO5505ELSEU=1
5525 IFX=5THENGT=SQR(GT):GOSUB5450:GOTO5
495
5530 IF LEN(TI$)=OTHENPRINT@40, I$:F=X:GO
T05495
5535 X1=INSTR(1,K$,LEFT$(TI$,4)):IFX1>OT
HEN5595
5540 IFU=OTHEN5800
5545 TT=VAL(TI$)
5550 IFF>OTHENIFL=1THENLPRINTMID$(F1$,F.
1);TT
5555 ONF+1 GOSUB5580,5560,5560,5565,5570
,5575,5580,5585,5590,5590:GOSUB5450:F=X:
PRINT@40, I$;:GOTO5495
5560 GT=GT*TT:RETURN
5565 GT=GT/TT:RETURN
5570 GT=GT^TT:RETURN
5575 GT=SQR(GT):RETURN
5580 GT=GT+TT:RETURN
5585 GT=GT-TT:RETURN
5590 RETURN
5595 X = ((X1-1)/7)+1
5600 ON X GOTO 5605,5625,5645,5665,5730,
5735,5755,5785
5605 X = VAL(RIGHT\$(TI\$,1))
5610 IFX<OORX>7THENBEEP:GOTO5500
5615 M(X) = GT
5620 GOTO5490
5625 X=VAL(RIGHT$(TI$,1))
5630 IFX<OORX>7THENBEEP:GOTO5625
5635 \text{ GT} = M(X)
5640 GOTO5490
5645 X=VAL(RIGHT$(TI$,1))
5650 IFX<OORX>6THENBEEP:GOTO5645
```

```
5655 M(X) = M(X) + GT
5660 GOTO5490
5665 IFL=1THENL=0ELSEL=1
5670 GOTO5490
5675 CLS:PRINT"Save totals and memory na
mes (Y/N)"
5680 I$=INKEY$:IFI$=""THEN5680
5685 IFI$="n"ORI$="N"THENRETURN
5690 PRINT@240, "Filename";: INPUTX$
5695 IFLEN(X$)>6THENX$=LEFT$(X$,6)
5700 OPEN"RAM: "+X$+".do"FOROUTPUTAS1
5705 FORX=0T06
5710 PRINT#1,M$(X);"=";M(X)
5715 NEXT
5720 \text{ PRINT} #1, "Display = ";GT
5725 RETURN
5730 GT=0:GOSUB5450:GOTO5495
5735 FORX=0T06
5740 M(X)=0
5745 NEXT
5750 GOTO5490
5755 \times V=VAL(RIGHT\$(TI\$,1))
5760 IFX>60RX<OTHENBEEP:GOTO5755
5765 PRINT@240, "New name";: INPUTX$
5770 IFLEN(X$)>5THENX$=LEFT$(X$,5)
5775 M$(X)=STR$(X)+X$:M$(X)=RIGHT$(M$(X)
 ,LEN(M\$(X))-1)
5780 GOTO 5490
5785 GOSUB5675:CLS:PRINT@240,"Quit (Y/N)
5790 X$=INKEY$:IFX$=""THEN5790ELSEIFS=1T
HENSOUND16383.5
5795 IFX$="Y"ORX$="y"THENGOSUB5805:MENU
5800 PRINT@240, "unknown"; : BEEP: GOT 05495
5805 K$="Files"+CHR$(13)+"/Load "+CHR$(3
4)+"/Save/Run"+CHR$(13)+"/List"+CHR$(13)
 +"///Menu"+CHR$(13)+"/"
 5810 B=1:E=0
 5815 FORX=1T08
 5820 E=E+1:IFMID$(K$,E,1)="/"THEN5830
 5825 GOTO5820
 5830 L$=MID$(K$,B,E-B):B=E+1:KEYX,L$:NEX
 5835 RETURN
```

BREAKEVEN UNIT ANALYSIS

This business analysis utility can be invaluable in helping you evaluate the profitability of products and in determining optimum levels of pricing, sales, and costs.

When you first run the program, you are asked for information about your product and your company. If you press <ENTER> without typing a number first, a zero is automatically used as the value. After you have entered all the fixed and variable costs (plant and equipment depreciation, rentals, interest rate on debts, administrative staff salaries, general office expenses, miscellaneous fixed expenses, labor costs per unit, material costs per unit, sales commissions per unit, other miscellaneous costs per unit, and, finally, the sales price per unit), the program lists the totals of the fixed costs, variable costs, and sales price.

Underneath these choices is listed *Breakeven Units*, the number of units you need to sell in order to have a net profit of zero. The program then lets you change these factors or continue to part B of the program. As you change the information in items 1 (fixed costs), 2 (variable costs), and 3 (sales price), the number of breakeven units will change. Continue making these changes until you are satisfied with the data. If there is no breakeven point, then the word *Error* will appear on the *Breakeven Units* line.

When you've finished with part A, enter 0. You're now in part B of the program, the profit analysis portion. As in part A, you can change the information in the four categories (fixed costs, variable costs, sales price, and units sold).

Example

Program	$Your\ response$
Enter fixed costs <enter> if none</enter>	:
Depreciation—plant & equip.?	1000
Rentals?	100
Interest charges on debt?	50
Salaries for admin. staff?	275
General office expenses?	100
Other fixed costs?	45

Enter variable costs PER UNIT	
Factory labor?	1.12
Materials?	2.02
Sales commissions?	5.00
Other variable costs?	
Sales price per unit?	50.00
0—Calculate profit	
1—Fixed costs \$1570	
2—Variable costs \$8.14	
3—Sales price \$50	
Breakeven Units 37	
Change # or 0?	3
Enter new value?	75
0—Calculate profit	
1—Fixed costs \$1570	
2—Variable costs \$8.14	
3—Sales price \$75	
Breakeven Units 23	
Change # or 0?	2
Enter new value?	1600
0—Calculate profit	
1—Fixed costs \$1570	
2—Variable costs \$1600	
3—Sales price \$75	
Breakeven Units Error	
Change # or 0?	2
Enter new value?	50
0—Calculate profit	
1—Fixed costs \$1700	
2—Variable costs \$50	
3—Sales price \$100	
Breakeven Units 34	
Change # or 0?	0
0—End	
1—Fixed costs \$1700	
2—Variable costs \$50	
3—Sales price \$100	
4—Units sold 34	
Profit $(- = loss) \$0$	4
Change # or 0?	4
Enter new value?	1000

- 0-End
- 1—Fixed costs \$1700
- 2—Variable costs \$50
- 3—Sales price \$100
- 4—Units sold 1000

Profit (- = loss) \$48300

Change # or 0?

0

Ref		Line Numbers
++		
:06920:	6935	
	6920	
:06945:	6960	
:06965:	6950	
	7040	
:06980:	7045	
:07010:	7015	
	7020 7040	
:FC :		
	Fixed cost	
:1\$:	6920 6930 695	0 6955
. 1.9	Company data	
: V C :		
•	Variable costs	0 7025 7035
: X :	7010 7015 702	0 7025 7035
:	Keyboard input	
:X\$(:	6975 7005	
•	Breakeven units	
:X(:		5 6970 6975
	6990 6995 700	
•	7045	
•	Data	
: Y :		
•	Keyboard input	5 7020 7040
: Z :	6985 7005 701	5 7020 7040
:	7045	
• •	Part A or B	
++		

Breakeven Unit Analysis Program

```
6900 'Breakeven units analysis
6905 DATA "Depreciation - plant & equip.
", "Rentals", "Interest charges on debt"."
Salaries for admin staff", "General offic
e expenses", "Other fixed costs", "x"
6910 DATA "Factory labor", "Materials", "s
ales commissions", "Other variable costs"
6915 CLS:PRINT"Enter fixed costs <ENTER>
 if none:"
6920 READI$::IFI$="x"THEN6940
6925 FC=0
6930 PRINTI$;:INPUTFC:X(1)=X(1)+FC
6935 GOT06920
6940 CLS:PRINT"Enter variable costs PER
UNIT"
6945 VC=0
6950 READI$: IFI$="x"THEN 6965
6955 PRINTIS;: INPUTVC: X(2) = X(2) + VC
6960 GOTO 6945
6965 CLS:INPUT"Sales price per unit"; X(3
6970 X(4)=INT(X(1)/(X(3)-X(2)))
6975 IF X(4)<0 THEN X$(4)="Error"ELSEX$(
4) = STR$(X(4))
6980 CLS
6985 IF Z=O THENPRINT"O - Calculate prof
it"ELSEPRINT"O - End"
6990 PRINT"1 - Fixed costs
                                $";X(1)
6995 PRINT"2 - Variable costs
                                $":X(2)
7000 PRINT"3 - Sales price
                                $":X(3)
7005 IFZ=0 THEN PRINT"
                           Breakeven Unit
   ";X$(4) ELSEPRINT"4 - Units sold
  ";X(4):PRINT"
                   Profit (-=loss) $";X(
5)
7010 PRINT@240, "Change # or O";:INPUTX
7015 IF(X>3 AND Z=0) OR (X>4 AND Z=1) TH
EN 7010
7020 IFX=0 THEN IF Z=0 THEN 7045ELSEEND
7025 PRINT@X*40, CHR$(154);
7030 PRINT@240, "Enter new value ";:INPUT
Υ
```

7035 X(X)=Y
7040 IF Z=0 THENGOTO6970ELSE7045
7045 Z=1:X(5)=(X(3)*X(4))-(X(1)+(X(2)*X(4))):GOTO6980

INVOICE

This is an extremely useful program for creating and logging invoices. After the appropriate information is entered for each sale, you are given the option of printing an invoice in triplicate on an 80-column printer or saving the invoice in a .DO file to print out later.

Invoices are sequentially numbered and saved in a master invoice file. The program creates and uses two files:

- 1. INV.DO. This file stores your company name and summaries of all invoices printed in the form: invoice number/company name/date/amount.
- 2. IV#.DO. This is the text of the invoice. Invoice 10 will be saved as IV10.DO.

First, the program checks for the INV.DO file with the name of your company and the last invoice number used. If the file is not present, the program asks you for this information (sample answers are shown in bold type):

- 1-Your Co. Name? ABC Corp.
- 2-Your address? 111 Main Street
- 3-Your C, S, Zip? Manchester, NH 03103

This last information may be entered with or without commas. This information will be printed on the top of the invoice. The computer will display:

Last invoice # was 0
This invoice will be 1
Press <ENTER> if correct or enter new Invoice
#.?

If you press <ENTER>, this invoice will be numbered 1, or you may enter any number you wish. If you enter a different number, then the next invoice will be that number plus 1.

Now the program prompts for the customer information (again, sample answers are shown in bold type):

- 4-Sold to Jane Jones
- 5—Company? Jones Co.

- 6-Address? 123 West Street
- 7—City, State, Zip Code
 - ? New York, NY 10021
- 8-Ordered by or purchase order number
 - ? verbal order per "Jane" 12/12/83

Any information may be entered, up to 60 characters in length.

9-Terms or Paid . . .

Paid VISA #5555 555 5555 555 1/08

This question may be answered with terms such as $net\ 10\ days$, 2% cash, on account, or other data. Commas are acceptable. If, though, the first four letters of the answer are Paid, paid, or PAID, as in the above example, then the next question (Amount paid?) will be asked. If any answer other than paid is given, then this question will be skipped.

10—Amount paid? 55.00

This question will be asked only if the first four letters of the answer to question 9 were paid. The amount paid will later be subtracted from the total amount due.

11—Other credits or (-) past due. <ENTER> if none. ?

If the customer has a discount coupon or credit on his or her account that you would like to apply to this invoice, enter the amount here. If the customer has a past due balance and you would like it to appear on this invoice, enter it as a negative number. Warning: The past due amount will be added to the total amount of the invoice and will be stored in the INV.DO file. If a previous invoice was issued, then the past due amount will appear twice in your records: first in the original invoice and again in this invoice. This could cause your total sales, as stored in the INV.DO file, to be overstated.

12—Explanation?

If any value was given for the previous question, this question will be asked. Otherwise, it will be skipped. The answer to this question will be printed next to the previous answer. A typical answer might be $50.00\ discount\ coupon$, return credit #1234, or past due amount.

13—Message for bottom of invoice

You can have any short message printed at the bottom of the first copy of the invoice. If you just press <ENTER>, then the message *Thank you for your order* will be printed.

14—Date sold? 12/12/83

Enter this in any form you choose. December 12, 1983 is also acceptable.

15—Salesman? Mark Robinson 16—Discount? 10

Many businesses give certain customers a discount on orders. Wholesalers typically list retail prices on invoices and give their distributors 45 or 50 percent off retail for their profit. If an amount is entered here, all prices will be calculated accordingly, and a line will appear on the invoice:

DISCOUNT 10% off retail

If just <ENTER> is pressed, then that line will not appear, and all prices will be unchanged. If you apply a different discount to every product, then just press <ENTER> and figure the appropriate discount into the price later.

The computer will display:

Press <ENTER> or enter a zero (0) for Quantity when done. 17—Quantity? 2

Enter the quantity of the first item sold. Any number between 1 and 9999 is acceptable. If your quantity is 10,000 or more, then enter 10, begin your product description (the next question) with per thousand, and enter the price per thousand when that information is requested.

18—Product?

Enter the product name. Commas are acceptable.

19—Retail?

Enter the retail price per unit of the item, even if this is not the price the customer will finally be charged. If you are selling to a dealer or store, then the customer can use this column to determine what price he or she is going to use to sell the product.

Enter the per-unit price that the customer is to pay for the item. If the customer will be paying the retail price less the discount entered previously, simply press <ENTER>. For example, if the discount was 10 percent, the quantity was 2, and the retail price was \$100, then pressing <ENTER> will cause the customer to be charged \$180 (100 less 10 percent, times 2).

If there was no discount entered and you just press <ENTER>,

then the customer will be charged full retail.

This question is most useful when the customer receives different discounts on different products. If, for example, product 1 retails for \$100 and the customer pays \$50, while product 2 retails for \$150 and the customer pays \$90, then the individual costs to the customer can be entered here.

The computer will then keep asking for Quantity until 0 or

<ENTER> is answered.

Note: Up to eleven items may be entered on an invoice. If you will require more, change the value of the variable W in line 6300 to reflect the higher value. As the invoices get bigger, you may need more room to store all the data. If you get an OS Error (out of string space), increase the value of the CLEAR statement in line 6300.

21—Would you like a printout (Y/N)

If you answer Y, then an invoice, in triplicate, will be printed on your 80-column printer. Copy 2 will say at the bottom: PLEASE RETURN THIS COPY WITH YOUR PAYMENT. Copy 3 will sav: FILE COPY.

22—Would you like the data saved to a .DO file (Y/N)

If you answer Y, a .DO file will be created for printing on an 80-column printer later.

In every case, the INV.DO file will be appended to store the invoice summary. The first character in the INV.DO file will always be an asterisk (*). This is a pointer used by the program.

```
Line Numbers
  Ref
:06330: 6330
:06335: 6345
:06350: 6340
:06435: 6440
:06445: 6445
:06480: 6565
:06485: 6485
:06495: 6495
:06540: 6530
:06555: 6545
                6875
:06570: 6825
:06660: 6650
:06770: 6485
:06810: 6810
:06835: 6815
:06840: 6840
:06880: 6845
:06885: 6305
: A$
       : 6700
                6705
                        6710
                                6715
                                        6720
         6725
         PRINTUSING format field
                                6410
                                        6605
:C$(
                 6400
                        6405
       : 6395
                         6620
                                6775
         6610
                 6615
         Customer information
: CC$
       : 6775
                 6780
         Used if no company name
                        6725
                                6780
: CR
       : 6425
                6710
         Amount paid
: D
       : 6460
                 6515
                        6650
         Discount
                6630
                        6780
: D$
       : 6450
         Date
:DI$
       : 6460
                 6655
         Discount
                 6770
: G
       : 6320
         Previous use pointer
:G$(
       : 6315
                 6320
                         6330
                                6580
                                        6585
         6590
                 6755
                         6770
         Seller information
                         6725
                                 6780
:GT
       : 6545
                 6705
```

```
Grand total
: I $
      : 6810
                6815
                        6840
                                6845
        Keyboard input
:LI$(: 6305
                6560
                        6685
: -
        Line to print
:LP
      : 6570
                6650
                        6655
                                6660
                                        6665
        6675
                        6695
:
                6685
                                6705
                                        6710
        6715
                6720
                        6725
                                6730
                                        6735
        6740
        Lineprinter position
: ME $
      : 6445
                6735
        Bottom of invoice message
      : 6385
                6570
: NO
                        6780
         Invoice number
: NO$
      : 6850
                6855
         Invoice number
:0$
      : 6415
                6640
        Order number, or P.O. number
:0X$
      : 6780
                6790
        Output file information
:PC#( : 6305
                6510
                        6515
                                6520
                                        6525
        6530
                6535
                        6545
        Price
:PC$( : 6305
                6530
                        6535
                                6540
                                        6560
        Price
:PR$( : 6305
                6495
                        6560
        Product descriptions
      : 6750
: OL
                6755
                        6825
        Page number
:QN
      : 6355
                6370
                        6375
                                6385
        Invoice Number
                6435
:QR
      : 6430
                        6715
                                6720
                                        6725
        6780
        Other credits to account
                6440
                        6715
:QR$
      : 6435
                                6720
        Other credits to account
                6720
:OR$( : 6715
        Other credits to account
:QU$( : 6305
                6490
                        6560
        Quantity
      : 6305
                6485
                        6490
                                6545
: QU(
        Quantity
                6500
:RE$( : 6305
                        6505
                                6560
        Retail price
: RE(
      : 6305
                6500
                        6515
```

```
Retail price
8
                 6645
:5$
       : 6455
         Salesman
                 6425
                         6635
       : 6420
:T$
         Terms
       : 6670
                 6680
:TI
         Total items
                                 6555
                                         6560
                 6545
                         6550
:TQ$( : 6305
                price
         Total
                         6550
                 6545
       : 6305
:TQ(
         Total price
       : 6465
                 6665
:TT$
         Header
                 6305
       : 6300
: W
         Number of items possible
                         6350
                                 6355
                                         6470
       : 6325
                 6330
: X
                                         6500
                         6490
                                  6495
                 6485
         6480
                                         6525
                                  6520
                 6510
                         6515
         6505
                         6540
                                  6545
                                         6550
                 6535
         6530
                                          6685
                         6670
                                  6680
         6555
                 6560
         Loop counter
       : 6335
                 6350
                          6355
: X$
          Information from INV.DO
                                  6695
                                          6730
                         6660
       : 6575
                 6595
: X X
         6740
         Output file
: Y
       : 6330
         Used to format data
                 6330
       : 6325
 :YP
          Used to format data
 :ZZ
        : 6495
          Miscellaneous variable
```

Invoice Program

```
6300 CLEAR2560: MAXFILES=2: W=11: REM MAXIM
UM NUMBER OF ITEMS
6305 ON ERROR GOTO 6885:DIM LI$(W):PC#(W
), PC$(W), PR$(W), QU(W), QU$(W), RE$(W), RE(W
),TQ(W),TQ$(W)
6310 OPEN"RAM: INV.DO"FORINPUTAS1
6315 INPUT#1,G$(1)
6320 IFG$(1)<>"*"THENG=1:LINEINPUT"Your
Co. Name? ":G$(1):LINEINPUT"Your address
? ";G$(2):LINEINPUT"Your C,S,Zip? ";G$(3
) ELSEINPUT#1.G$(1):INPUT#1.G$(2):INPUT#
 ,G$(3)
6325 FORX=1T03:YP=1
6330 Y=INSTR(YP,G$(X),","):IFY>OTHENMID$
(G$(X),Y,1)=" ":YP=Y+1:GOTO6330 ELSENEXT
6335 INPUT#1, X$
6340 IFEOF(1)THEN6350
6345 GOTO6335
6350 X=INSTR(1,X$,"/")
6355 QN=VAL(LEFT$(X$,X-1))
6360 CLOSE
6365 ON ERROR GOTO O
6370 PRINT"Last Invoice # was ";QN
6375 PRINT"This Invoice will be"; QN+1
6380 PRINT"Press <ENTER> if correct or e
nter new
            Invoice #.":
6385 INPUT NO: IF NO=O THEN NO=ON+1
6390 CLS
6395 LINEINPUT"Sold to?":C$(1)6400 LINEINPUT"Company?":C$(2)
6405 LINEINPUT"Address?";C$(3)
6410 LINEINPUT"City, State, Zip code
                       ?":C$(4)
6415 LINEINPUT"Ordered by or purchase or
der number
                       ?":0$
6420 LINEINPUT"Terms or Paid...
                       ?":T$
6425 IFLEFT$(T$,4)="PAID" OR LEFT$(T$,4)
="paid"OR LEFT$(T$.4)="Paid"THEN INPUT"A
mount paid "; CR
6430 INPUT"Other credits or (-)past due.
 <ENTER> if none. ":OR
6435 IF QR<>O THEN LINEINPUT"Explainatio
```

```
n? ";QR$
6440 IF LEN(QR$)>60 THEN PRINT"60 chr ma
x.":GOTO 6435
6445 LINEINPUT"Message for bottom of inv
               ?"; ME$: IFLEN(ME$)>60 THEN
oice
PRINT"60 LETTERS MAXIMUM, PLEASE.":GOTO6
445
6450 CLS:INPUT"Date sold";D$
6455 INPUT"Salesman ";S$
6460 INPUT"Discount ";D:DI$=STR$(D)+"% 0
FF RETAIL"
6465 TT$="QUAN DESCRIPTION
                                PRICE
                       RETAIL
TOTAL"
6470 X = 0
6475 CLS:PRINT"Press <ENTER> or enter a
               Quantity when done."
zero (0) for
6480 X = X + 1
6485 INPUT"Quantity";QU(X):IFQU(X)=0 THE
N 6770 ELSE IF QU(X)>9999THEN 6485
6490 QU$(X)=STR$(QU(X)):QU$(X)=QU$(X)+ST
RING$((6-LEN(QU$(X)))," ")+" "
6495 PRINT"Product? "; STRING$(29,".");:Z
Z=CSRLIN:PRINT@(((ZZ+1)*40)-31),"";:LINE
INPUT PR$(X):IFLEN(PR$(X))>29 THEN 6495
ELSE: PR$(X) = PR$(X) + STRING$((43 - LEN(PR$(X)
))),"")+""
6500 INPUT"Retail"; RE(X): RE$(X) = STR$(RE(
X)):IFRE(X)=INT(RE(X))THENRE$(X)=RE$(X)+
".00"
6505 RE$(X)=RE$(X)+STRING$((8-LEN(RE$(X)
6510 INPUT"Price or <ENTER> if calculate
            ":PC#(X)
6515 IFPC#(X)=0 THEN PC#(X)=INT(RE(X)*(1
00-D))/100
6520 PC#(X) = PC#(X) * 100: PC#(X) = INT(PC#(X)
6525 PC#(X)=PC#(X)/100
6530 PC$(X)=STR$(PC#(X)):IFPC#(X)=INT(PC
\#(X)) THENPC$(X)=PC$(X)+".00":GOT06540
6535 IF PC#(X)*10=INT(PC#(X)*10)THENPC$(
X) = PC (X) + "0"
6540 PC$(X) = PC$(X) + STRING$((8-LEN(PC$(X)))
)),"")+""
```

```
6545 TQ(X) = PC\#(X)*QU(X):GT=GT+TQ(X):TQ\$(
X) = STR(TQ(X)): IF TQ(X) = INT(TQ(X))THENTQ
$(X)=TQ$(X)+".00":GOTO6555
6550 IFTQ(X)*10=INT(TQ(X)*10)THEN TQ$(X)
=TQ$(X)+"0"
6555 TQ$(X)=TQ$(X)+STRING$((9-LEN(TQ$(X).
)),"")+""
6560 LI(X)=QU(X)+PR(X)+RE(X)+PC(X)+
TQ$(X)
6565 GOTO 6480
6570 LP=0:PRINT#1, "INVOICE"; TAB(60); "NUM
BER ":NO
6575 FORXX=1TO4:PRINT#1,"":NEXT
6580 PRINT#1, "From:
     ":G$(1)
6585 PRINT#1."
     ";G$(2)"
6590 PRINT#1."
  ";G$(3)
6595 FORXX=1T04:PRINT#1,"":NEXT
6600 PRINT#1, "Sold to:"
6605 PRINT#1."
                       ":C$(1)
6610 PRINT#1,"
                        ":C$(2)
6615 PRINT#1,"
                        ":C$(3)
6620 PRINT#1,"
                       ":C$(4)
6625 PRINT#1,
             11.11
6630 PRINT#1, "Date sold:
                                    ":D$
6635 PRINT#1,
             ."Terms
                                    ";T$
6640 PRINT#1, "Ordered by or PO#
                                    ":0$
6645 PRINT#1, "Sold by
                                    ":S$
6650 LP=23:IF D=0 THEN 6660
6655 PRINT#1, "Dealer Discount
                                   ";DI$:L
P = LP + 1
6660 FORXX=1TO4:PRINT#1,:LP=LP+1:NEXT
6665 PRINT#1, STRING$(79."="):PRINT#1,""
:PRINT#1, TT$:PRINT#1.STRING$(79."-"):LP
=LP+4
6670 TI = X
6675 PRINT#1, "": LP=LP+1
6680 FORX=1TO TI
6685 PRINT#1, LI$(X):LP=LP+1
6690 NEXT
6695 FORXX=1T04:PRINT#1,"":LP=LP+1:NEXT
6700 A$="$###,###.##"
6705 PRINT#1,"
             Total Order ";:PRINT#1, U
```

```
SING A$;GT:LP=LP+1
6710 IF CR>O THEN PRINT#1."
                      Paid with order
";:PRINT#1,USINGA$;CR:LP=LP+1
6715 IF QR>0 THEN QR$(1)=STRING$((50-LEN)
(QR\$)),"")+QR$+" - ":PRINT#1,QR$(1);:P
RINT#1,USINGA$;QR:LP=LP+1
6720 IF QR<0 THEN QR$(1)=STRING$((50-LEN
(QR$)),"")+QR$+" ":PRINT#1,QR$(1);:P
RINT#1, USINGA$; ABS(QR):LP=LP+1
6725 PRINT#1."
               TOTAL DUE ";:PRINT#1.US
INGA$;GT-CR-QR:LP=LP+1
6730 FORXX=1 TO 4:PRINT#1."":LP=LP+1:NEX
T
6735 IFME$=""THEN PRINT#1, "Thank you for
 your order":LP=LP+1:ELSE PRINT#1,ME$:LP
=LP+1
6740 FORXX=1 TO 63-LP
6745 PRINT#1,"":NEXT
6750 IF QL=2 THEN PRINT#1, "PLEASE RETURN
 THIS COPY WITH YOUR PAYMENT"
6755 IF OL=3 THEN PRINT#1, G$(1); FILE
COPY"
6760 PRINT#1,"":PRINT#1,""
6765 RETURN
6770 IFG=1THENOPEN"INV.DO"FOR OUTPUTAS1:
PRINT#1, "*": PRINT#1, G$(1): PRINT#1, G$(2):
PRINT#1.G$(3):CLOSE
6775 IFC$(2)=""THENCC$=C$(1)ELSECC$=C$(2
6780 OX$=STR$(NO)+"/"+CC$+"/"+D$+"/"+STR
$(GT-CR-QR)
6785 OPEN"INV.DO"FORAPPENDAS1
6790 PRINT#1.0X$:
6795 CLOSE
6800 CLS
6805 PRINT"Would you like a printout (Y/
N ) "
6810 I$=INKEY$:IFI$=""THEN6810
6815 IFI$="n"ORI$="N"THEN6835
6820 OPEN"LPT: "FOROUTPUTAS1
6825 FOROL=1T03:GOSUB6570:NEXT
6830 CLOSE
6835 PRINT"Would you like data saved to
a .DO file (Y/N)"
```

```
6840 I$=INKEY$:IFI$=""THEN6840
6845 IFI$="n"ORI$="N"THEN6880
6850 NO$=STR$(NO):NO$=RIGHT$(NO$,LEN(NO$)-1):IFLEN(NO$)>4THENNO$=RIGHT$(NO$,4)
6855 FN$="IV"+NO$
6860 FN$="RAM:"+FN$+".DO"
6865 PRINT"Data saved in ";FN$
6870 OPEN FN$ FOROUTPUTAS1
6875 GOSUB6570
6880 CLOSE:MAXFILES=O:CLEARO:MENU
6885 IFERR=52THENOPEN"INV.DO"FOROUTPUTAS
1ELSEONERRORGOTOO:RESUME
6890 PRINT#1,"/":PRINT#1,"O/":CLOSE:RESUME
```

JOB QUOTE

The Job Quote program is a selling aid. It allows a representative to specify and price a job on the spot. If a printer is available, the sales rep can offer the potential customer a written quotation. Without a printer, the program stores the relevant information in a .DO file for later review.

In the past, I used the program to develop a price on security and fire alarm systems for my customers. I kept my Model 100 in a briefcase along with the small Radio Shack CGP-115 printer and cable. All I needed to do was plug in the printer.

The program will work with any type of business that combines equipment and labor to make a final product or service.

When you execute the program, it first looks for a file in memory called NAME.DO containing information on your own business. If the file is not present, the initial questions will be asked and the NAME.DO file created.

These questions are (with sample answers shown in bold type):

- 1—Your company name? ABC Corp.
- 2-Your company address? 111 Main Street

Do not use commas in the answer.

3-Your city, state, zip? Manchester, NH, 03103

Enter the three items, separating them with commas.

4—Your phone number? (603) 555-1212

Type your phone number as you would like it to appear on the quotation. Any format that does not include commas is acceptable.

5—Hourly labor rate? 25

This information will now be saved in a file called NAME.DO. The NAME.DO file will look like this if you examine it with TEXT:

ABC Corp. 111 Main Street Manchester NH 03103 (603) 555-1212 25

If this company information is already on file in the computer's RAM, then the starting question will be (again, sample answers are shown):

6-Customer name? XYZ Corp.

7—Company? 111 Main Street Corp.

8—Address? 111 Main Street

Type the information using no commas.

9-City, State, Zip? New York, NY, 10021

Enter the three items, separated by commas.

10—Phone? (212) 555-1212 11—Other? Attn: Jane Jones

The *Other* question can be used for any important piece of customer information desired. Do not use commas.

12-Type of job? Burglar Alarm System

Any appropriate information may be entered, without commas, please.

13—Quan., item? 2, Motion detectors

Begin entering your list of materials.

14—Cost? **245.00**

Enter the *per-item* cost of the item previously entered. In this example, motion detectors cost \$245 each.

15—Labor hours? 2

Enter the labor required to install one motion detector. When calculated later, the labor hours will be multiplied by the quantity

entered above and the hourly labor rate entered during the initial question section.

The computer will respond with:

2-Motion detectors 490 4

This displays the total cost and labor hours.

The program will continue with the Quan., item? prompt until you press <ENTER> in answer to it without entering any data.

16—Misc. costs? 100.00

Enter an amount, if needed, for difficulty, travel, or other charges to the customer. Press <ENTER> if none.

Enter any additional labor needed. Press <ENTER> if none. The computer will then print the totals on the screen:

Equipment \$590.00 Labor \$400.00 TOTAL COST = \$990.00

18—Quote? **950**

Enter the price you wish to give to the customer. In this case the sales rep decided to give the customer a few dollars off the regular price.

19—Lineprinter (Y/N) y

If you have a printer connected and ready and this question is answered y or Y, then a printout like the following will be made. This program will not use more than 40 characters per line.

ABC Corp. 111 Main Street Manchester, NH, 03103 (603) 555-1212

XYZ Corp.
111 Main Street Corp.
111 Main Street
New York, NY, 10021
(212) 555-1212
Attn: Jane Jones
Burglar Alarm System
Work to consist of:

2—Motion detectors

. [remaining items] TOTAL COST \$950.00

This quotation can be left with the customer. The charges for miscellaneous costs or labor, and the total calculated price, are not shown, only the equipment list and total quote.

The program creates a file in which the quotation is stored with itemized costing information. The name of this new file is the first 6 characters of the company name. In this example, it would be 111 MA.DO. The file will look like this:

XYZ Corp.
111 Main Street Corp.
111 Main Street
New York, NY, 10021
(212) 555-1212
Attn: Jane Jones
Burglar Alarm System
2—Motion detectors
Misc. cost \$100
Misc. labor \$300
Total cost \$590
Total labor \$400
Price \$990
Quote \$950

Job Quote is designed to operate with eleven items total. If you wish more, change the value of the variable W in line 5855. As Job Quote gets bigger, you may need more room to store the data. If you get an OS Error (out of string space), increase the value of the CLEAR statement in line 5855.

Ref	_						Line	Numbers
:05910):	5950						
:05955):	5915 6015						
:06060 :06075		6050 6065						
:06090):	6080						
:06135 :06160		5860 6210						
:06165	:	6135						
: A\$(:	5865 5890	5870 6000		587		5880 6035	
:		6045						0040
: :C(•	Custom 5855	er inf 5920	or	ma1 593		า 5940	5945
:		6090					3340	3343
: C1	:	Cost 5955	5960		610) 5		
:		Miscel	laneou	S	COS	sts		
:E\$(•	5855 6085	5910 6090		591	15	5935	5940
: :L(Equipmo	ent				5040	5045
:	•	5855 6090	5925		593	30	5940	5945
: :L1	•	Labor 1 5965	hours		611	0		
:	•	Miscel	5970 Taneou		611 lab			
:LB	:	5980	5990		611		6150	6190
•		6205 labor	per it	em				
:LP	:	6010 6065	6015		603		6040	6050
•		Linepri	6080 inter	f1	610 ag	10		
: N	:		5930		5 9 3	5		
:NA\$(:	6020	6145		617	0	6175	6180
•		6185 Seller	6200	m 2	44.	_		
· Q	:	5995	infor 6100		612			
: :S\$(Quote 5895	6055		606	n		
	-		3000	,	500	9		

TC	:		of job 5945 6120	5960	5975	5990
TL	:	Total 5905 6120		5970	5980	5990
:		Total	labor			
: W		5855				
:			r of ite	ems per	roso	E02E
: X		5905	5910	5915		5925
:		5930	5935	5940	5945	6075
		Loop	counter			
: X \$:	6010				
		-	ard inpu	it		
: Z		6030			6085	6090
• 4	•	6145				
•						
:		Loop	counter			

Job Quote Program

```
5850 MAXFILES=2
 5855 CLEAR 2000: W=11:DIM E$(W):L(W),C(W)
 5860 GOSUB 6135
 5865 INPUT"Customer name"; A$(1)
 5870 INPUT"Company"; A$(2)
 5875 INPUT"Address"; A$(3)
 5880 INPUT"City, State, Zip"; A$(4), A$(5)
 .A$(6)
 5885 INPUT "Phone"; A$(7)
5890 INPUT"Other"; A$(8)
5895 INPUT"Type of job"; S$(1)
5900 PRINT"Work to consist of:"
5905 X=1:TC=0:TL=0
5910 INPUT"Quan, item"; N, E$(X)
5915 IF E$(X)=""THENX=X-1:GOTO5955
5920 INPUT"Cost";C(X)
5925 INPUT"Labor hours"; L(X)
5930 IFN>OTHENC(X)=C(X)*N:L(X)=L(X)*N
5935 E$(X)=STR$(N)+"-"+E$(X)
5940 PRINTE$(X);C(X);L(X)
5945 TC=TC+C(X):TL=TL+L(X):X=X+1
5950 GOTO5910
5955 INPUT"Misc. costs";C1
5960 TC=TC+C1
5965 INPUT"Misc. labor hrs.";L1
5970 TL=TL+L1
5975 PRINT"Equipment = $";TC
5980 PRINT"Labor = $":TL*LB
5985 PRINT"
5990 PRINT"TOTAL COST= $":TC+(TL*LB)
5995 PRINT: INPUT "Quote"; Q
6000 FN$="RAM:"+LEFT$(A$(2),6)+".DO"
6005 OPEN FN$ FOR OUTPUT AS 1
6010 INPUT"Lineprinter (Y/N)";X$:IF X$="
Y" OR X$="y" THEN LP=1
6015 IFLP=OTHEN 6030
6020 LPRINT NA$(1):LPRINT NA$(2):LPRINT
NA$(3);", "; NA$(4);", "; NA$(5):LPRINT NA
$(6)
6025 LPRINT".....
6030 FORZ=1T03:IFLP=1THENLPRINTA$(Z)
6035 PRINT#1,A$(Z):NEXT.
6040 IFLP=1THENLPRINTA$(4);", ":A$(5);",
 ";A$(6):LPRINTA$(7):LPRINTA$(8)
```

```
6045 PRINT#1,A$(4);", ";A$(5);", ";A$(6)
:PRINT#1,A$(7):PRINT#1,A$(8)
6050 IFLP=1THENLPRINT:LPRINTELSE6060
6055 LPRINTS$(1)
6060 PRINT#1.S$(1)
6065 IFLP=1THENLPRINT"Work to consist of
: "ELSE6075
6070 LPRINTSTRING$ (40, "-")
6075 FORZ=1TOX
6080 IFLP=1THENLPRINTELSE6090
6085 LPRINTE$(Z);
6090 PRINT#1,E$(Z);C(Z);L(Z)
6095 NEXT
6100 IFLP=1THENLPRINT:LPRINT"TOTAL COST
";:LPRINTUSING"$$#,#####.##";Q
6105 PRINT#1, "Misc Cost $"; C1
6110 PRINT#1, "Misc Labor$"; L1*LB 6115 PRINT#1, "Total Cost$"; TC
6120 PRINT#1, "Total Labor"; TL: PRINT#1, "P
rice
     ":TL+TC
6125 PRINT#1, "Quote";Q
6130 END
6135 ON ERROR GOTO 6165
6140 OPEN"RAM: NAME. DO" FOR INPUT AS 2
 6145 FOR Z=1 TO 6:INPUT#2, NA$(Z):NEXT
 6150 INPUT#2, LB
 6155 CLOSE
 6160 RETURN
 6165 IF ERR<>52 THEN ON ERROR GOTO O:RES
 UME
 6170 INPUT"Your Company name"; NA$(1)
 6175 INPUT"Your company address"; NA$(2)
 6180 INPUT"Your city, state, zip
             "; NA$(3), NA$(4), NA$(5)
 6185 INPUT "Your phone number"; NA$(6)
 6190 INPUT"Hourly labor rate $";LB
 6195 OPEN"RAM: NAME. DO" FOR OUTPUT AS 2
 6200 FOR Z=1T06:PRINT#2,NA$(Z):NEXT
 6205 PRINT#2, LB
 6210 RESUME 6160
```

CALENDAR

Calendar is a simple, yet useful, utility for printing a calendar for any month, any year. Simply enter the month and year for which you want a calendar, and it will appear on the display. If you press <ENTER> instead of entering a date, you'll get a calendar for the month and year as indicated on the Model 100 menu (make sure that the current date in the Model 100 clock is correct, or your calendar will be for a month other than the correct one).

If you have a printer connected and ready, press the PRINT

function key to receive a printout of the calendar display.

If you want to use Calendar as a subroutine in another program, all you have to do is merge it with the other program and add two lines:

1~ KEY(1)ON:ON KEY GOSUB8620 8620 DA%=0:D\$=" "

Make sure that none of the line numbers of the Calendar routine write over any of the lines of your program. Line 1 must be included for this routine to work inside another program. Make sure none of the variables used in Calendar affect the variables in your program.

When you run your program with the Calendar routine in it and you want to see the calendar, press the F1 key. The calendar will appear on your display. Press <ENTER> to return to your program.

	Re	ef					Line r	lumbers
+.			+					
: (380	520	:	8630	8640	8740		
		725		8725				
		735		8610				
		745		8655				
	C\$:	8725				
:	•			Keyboar	d inpu	it		
	D		:	8685	8760			
			•	Day				
	D\$:	8620	8625	8630	8635	
	υΨ		•	Date				
	D%		:	8685	8690	8715		
	U /0		•	Day	0000			
	DΑ	9		8620	8625	8700	8710	
	UA	/0	•	Day	0020			
٠	I %		:	8630	8635	8660	8695	8700
	1 /0		•	8705	8710	8715		8720
					n date			
•				8660	8675	decou iii	9	
•	M\$:		0073			
		۰/		Months	0665	8695	8715	
	MD	76	:	8660			0713	
				Days i	8640	8645	8665	8675
	٧		:	8635		0043	0003	0075
				8750	8760			
	W			Year	0640	0660	8665	8745
:	M		:		8640	8660	0003	0743
				8755				
				Month	0750			
- 1	X		:		8750	1		
				Calcul		variable		
	Υ.		:		8750		8760	
					ation	variabl	е	
	: Z		:		8755	8760		
	•			Calcul	ation	variabl	е	
	+		-+					

Calendar Program and Subroutine

```
8600 ' with permission from
        Michael M. Rubenstein
        Compuserve <70205,1144>
8605 CLEAR 1024
8610 ON ERROR GOTO 8735
8615 PRINT:PRINT"Press <ENTER> for curre
nt month or enter"
8620 DA%=0:D$="":INPUT "Month/year (MM/Y
Y)";D$
8625 IF D$="" THEN D$=DATE$:DA%=VAL(MID$
(D$,4,2)):D$=LEFT$(D$,3)+RIGHT$(D$,2)
8630 I%=INSTR(D$,"/"):IF I%<2 OR I%>3 OR
 I%=LEN(D$) THEN BEEP:GOTO 8620
8635 W=VAL(LEFT$(D$, I%-1)):V=VAL(RIGHT$(
D$, LEN(D$) - I%)): X = 1
8640 IF W<1 OR W>12 OR V<0 THEN BEEP:GOT
0 8620
8645 IF V<100 THEN V=V+1900
8650 ON ERROR GOTO O
8655 GOSUB 8745
8660 FOR I%=1 TO W:READ M$, MD%:NEXT I%
8665 IF W=2 THEN MD%=MD%-(0=V MOD 4)+(0=V
V MOD 100)-(0=V MOD 400)
8670 CLS
8675 PRINT TAB(7); M$; " "; V
8680 PRINT TAB(6);" Sun Mon Tue Wed Thu
Fri Sat"
8685 D%=D-7*INT(D/7)
8690 PRINT TAB(6); SPACE$(4*D%);
8695 FOR I%=1 TO MD%
8700 IF I%=DA% THEN PRINT CHR$(27); "p";
8705 PRINT USING "####"; 1%;
8710 IF I%=DA% THEN PRINT CHR$(27); "q";
8715 D%=D%+1:IF D%>6 AND I%<>MD% THEN PR
INT:PRINT TAB(6);:D%=0
8720 NEXT 1%
8725 C$=INKEY$:IF C$="" THEN 8725
8730 MENU
8735 IF ERL<>60 THEN ON ERROR GOTO O:RES
UME
8740 BEEP: RESUME 8620
8745 Y = -INT ((14 - W)/12)
8750 Z=X-32074+INT (1461*(V+4800+Y)/4)
8755 Z = Z + INT (367 * (W - 2 - 12 * Y) / 12)
```

```
8760 D=Z-INT (3*INT ((V+4900+Y)/100)/4)
8765 RETURN
8770 DATA January, 31
8775 DATA February, 28
8780 DATA March, 31
8785 DATA April, 30
8790 DATA May, 31
8795 DATA June, 30
8800 DATA July, 31
8805 DATA August, 31
8810 DATA September, 30
8815 DATA October, 31
8820 DATA November, 30
8825 DATA December, 31
```

DAYS BETWEEN DATES

This program is actually a *subroutine* designed to be used, normally, by another program to count how many days there are between two given dates.

The main program, in such an instance, would call this program with a GOSUB 7065 command.

Before using this program, you must set up the following variables:

The future-most date:

M1 = Future-most month D1 = Future-most day Y1 = Future-most year

The lesser date:

MM = Lesser month DD = Lesser day YY = Lesser year

This subroutine is used in the Weighted Average Number of Stock Shares Outstanding program (chapter three). When this program returns control back to the main program, the variable DB will hold the number of days between the two dates.

To use this subroutine as an independent program, make these changes to the listing:

7050 INPUT"FUTURE-MOST MONTH, DAY, YEAR";M1,D1,Y1
7055 INPUT"ENTER LESSER MONTH, DAY, YEAR";MM,DD,YY
7175 PRINT"THERE ARE";DB" DAYS BETWEEN";M1"/";D1"/";Y1" AND ";MM"/";DD"/";YY

Ref			Line Nu	mbers
:07150: :07170:	7085 7150	7165		
	7065 7170			
	Future-most of 7090 7100 7170	7115	7135	7155
	Days between 7065 7090		7125	7170
		7090	7115	7155
	Days in mont 7065 7085 Future-most	7150		
. MM :	7065 7085 7110 7115	7090 7125	7095 7150	7100 7155
•	7160			
: : X :	Lesser month 7080 7110	7115	7120	
: :Y1 :	Loop counter 7065 7085		7130	
: : Y Y :	Future-most 7065 7085 7105 7115	year 7090 7125	7095 7130	7100 7135
•	7140 7155 Lesser year			
TT				

Days between Dates Program and Subroutine

```
7050 ' DAY BETWEEN DATES
 DBD
7055 ' ****** SUBROUTINE ******
7060 ' M1/D1/Y1 - MM/DD/YY
7065 IF YY>Y1 OR (YY=Y1 AND MM>M1) OR (Y
Y=Y1 AND MM=M1 AND DD>D1) THEN PRINT"DAT
E ENTRY ERROR": END
7070 DIM M(12)
7075 DATA 31,28,31,30,31,30,31,31,30,31,
30,31
7080 FOR X=1 TO 12:READM(X):NEXT X
7085 IF Y1=YY AND M1=MM THEN GOTO 7170
7090 DB=M(MM)-(DD-1):IF INT(YY/4)=YY/4 A
ND MM=2 THEN DB=DB+1
7095 DD=1:MM=MM+1:IFMM=13 THEN MM=1:YY=Y
Y+1:GOT07130
7100 PRINTDB; " TO "; MM; "/01/"; YY
7105 IF Y1=YY THEN 7150
7110 FOR X=MM TO 12
7115 DB=DB+M(X):IF INT(YY/4)=YY/4 AND MM
=2 THEN DB=DB+1
7120 NEXT X
7125 MM=1:DD=1:YY=YY+1
7130 IF Y1=YY THEN 7150
7135 DB=DB+365:IF INT(YY/4)=YY/4 THEN DB
=DB+1
7140 YY = YY + 1
7145 GOTO 7130
7150 IFM1=MM THEN 7170
7155 DB=DB+M(MM): IF INT(YY/4)=YY/4 AND M
M=2 THEN DB=DB+1
7160 MM=MM+1
7165 GOTO7150
7170 IF DD=D1 THEN 7175 ELSE DB=DB+(D1-D
7175 RETURN
```

Management Decision Making

Managers and other businesspeople use a number of methods to make decisions. Committee meetings, bar charts, computer analysis, consultations, pie charts, DECIDE analysis, flow charts, and decision trees are among the many forms and methods of correlating relevant information.

Often, the larger the organization, the more sophisticated the decision-making process. This does not necessarily imply accuracy or effectiveness. I can't help but wonder what decision-making process was used by the manufacturers of M&M candies when they refused to allow the use of their product in the movie E.T. (Reese's Pieces, the candy used in the movie, experienced an unprecedented jump in sales.)

The programs in this chapter can help you analyze the financial aspects of a decision. These programs allow you to compare different terms and rates; they simply provide information in a more understandable manner. In some cases, a program will make a recommendation. Note that there are many additional factors that influence a decision and that any such recommendation is based on very basic information and calculations.

TERM VERSUS WHOLE LIFE **INSURANCE**

When buying life insurance, you usually have two choices: whole life and term. Whole life insurance policies have a built-in savings or investment program and a specified cash value at the end of a specified period of time. Term policies don't build up to any cash value, but they do offer protection at a much lower premium rate.

Many advisors feel that you should buy term instead of whole life and put the difference in premiums into a savings account. In actuality, this depends on a number of factors, primarily whether you can invest your money at a better rate than the whole life insurance company offers.

Which you choose depends on your specific financial situation and goals, but this program will tell you which type of policy will

give you the best results for a specified period of time.

The computer takes the premiums of the two policies and the whole life policy's ending cash value and compares the difference in premiums with putting money in a bank, with specific interest earning and compounding rates. Then it makes a suggestion as to which course of action you should take. The program assumes that the interest rate you supply remains constant over the entire period of time that the whole life policy is written to cover.

Examples

Program	Your $response$
	response
Monthly premium of term policy? Monthly premiums of whole life	4.6
policy?	12
Enter the cash value of the whole life	
policy?	5000
After how many years?	25
Enter current annual interest rate?	9.97
Compounded how many times a year?	12
The option to your best advantage:	
Buy the term insurance and put the dif-	
ference in the cost between the policies	
(\$7.4) into a savings account.	

You come out ahead by \$4,849.69. Press <ENTER> to continue, M for Menu

Monthly premium of term policy?	9
Monthly premiums of whole life	
policy?	12
Enter the cash value of the whole life	
policy?	5000
After how many years?	25
Enter current annual interest rate?	6
Compounded how many time a year?	12
The option to your best advantage:	
Buy the whole life policy. Putting the	
difference in cost between the two pol-	
icies (\$3) in a savings account	
would net you \$2,910.62,	
less than the cash value of the policy.	
Press <enter> to continue, M for Menu</enter>	

```
Line Numbers
 Ref
:03250: 3345
:03345: 3335
:09000: 3300
:10000: 3345
                        9005
: C
      : 3295
                9000
        Compounding periods
                9015
: CP
      : 9005
        Compounds per payment
      : 3270
                3325
: CV
        Cash value
      : 9000
                9015
:IC
        Interest rate/compounding period
                3320
                       9020
:IP
      : 3310
        Interest calculator
:IR
      : 3290
                9000
        Current interest rate
      : 3285
                9005
: N2
        Compound periods per year
                3305
: N3
      : 3285
        Months until maturity
: P#
      : 3310
                3320
                        3325
                                3335
                                       3340
        Miscellaneous variable
:PQ
      : 3280
                3310
        Cost difference
                9020
      : 9015
:0 V
        Effective interest rate
: T
                3285
      : 3275
        Years
      : 3260
                3280
                        3335
                                3340
:TL
        Term policy cost
      : 3255
                        3340
: U$
                3335
        PINTUSING format field
                3280
                        3335
                                3340
      : 3265
:WL
        Whole life policy cost
      : 3305
                3315
                        9015
: X
        Loop counter
```

Term versus Whole Life Insurance Program

```
3250 CLS:PRINT" COST OF TERM VS WHOLE L
IFE INSURANCE": REM D2
3255 U$="$$#,#####.##"
3260 INPUT"Monthly premium of term polic
y";TL
3265 PRINT"Monthly premiums of whole lif
e":INPUT"policy";WL
3270 INPUT"Enter the cash value of the w
hole life policy"; CV
3275 INPUT"After how many years";T
3280 PQ=WL-TL
3285 N3=T*12:N2=12
3290 INPUT"Enter current annual interest
 rate"; IR
3295 INPUT"Compounded how many times a y
3300 GOSUB9000: FIND EFFECTIVE INTEREST
 RATE PER PAYMENT
3305 FOR X=1 TO N3
3310 P#=PQ+(P#+(P#*((IP)/100))): ' MOVE F
WD 1 PMT PERIOD
3315 NEXT X
3320 P#=P#+(P#*((IP)/100)): ' MOVE FWD LA
ST PMT PERIOD
3325 P#=P#-CV
3330 CLS:PRINT"The option to your best a
dvantage:"
3250 CLS:PRINT" COST OF TERM VS WHOLE L
IFE INSURANCE": REM D2
3255 U$="$$#,#####.##"
3260 INPUT"Monthly premium of term polic
v":TL
3265 PRINT"Monthly premiums of whole lif
e":INPUT"policy";WL
3270 INPUT"Enter the cash value of the w
hole life policy"; CV
3275 INPUT"After how many years";T
3280 PO=WL-TL
3285 N3=T*12:N2=12
3290 INPUT"Enter current annual interest
 rate"; IR
```

```
3295 INPUT"Compounded how many times a y
3300 GOSUB9000: 'FIND EFFECTIVE INTEREST
 RATE PER PAYMENT
3305 FOR X=1 TO N3
3310 P#=PQ+(P#+(P#*((IP)/100))):' MOVE F
WD 1 PMT PERIOD
3315 NEXT X
3320 P#=P#+(P#*((IP)/100)): ' MOVE FWD LA
ST PMT PERIOD
3325 P#=P#-CV
3330 CLS:PRINT"The option to your best a
dvantage:"
3335 IF P#>O THEN PRINT"Buy the Term Ins
urance and put the dif- ference in the c
ostbetween the policies ($";WL-TL;") int
o a savings account.":PRINT"You come out
 ahead by";:PRINTUSINGU$;P#;:PRINT".":GO
T03345
3340 PRINT"Buy the Whole Life policy.
utting the difference in cost between th
e two pol- icies ($";WL-TL;") in a savin
gs account":PRINT"would net you";:PRINTU
SINGU$; ABS(P#); ", ": PRINT" less than the c
ash value of the policy."
3345 GOSUB10000:RUN3250
9000 IC=(IR/C)/100: 'INTEREST RATE PER CO
MPOUNDING PERIOD
9005 CP=C/N2: 'COMPOUNDS PER PAYMENT
9010 'FIND EFFECTIVE INTEREST RATE FOR C
2 PERIODS
9015 OV=1:FOR X=1 TO CP:QV=QV+(QV*IC):NE
9020 IP=(OV-1)*100: 'IP=INTEREST PER PAYM
FNT
9025 RETURN
10000 PRINT@281."Press <ENTER> to contin
ue, M for MENU";
10005 A$=INKEY$:IFA$="M"ORA$="m"THENMAXF
ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
10005ELSERETURN
```

TIME PAYMENT VERSUS **PURCHASE**

Occasionally when selling goods, a sales representative will offer you the opportunity to buy the items on a time payment, or credit, plan. Before buying anything, you should compare the payments and interest rate charged with the actual purchase price of the product. You might find that, while the plan may offer "easy credit," it isn't a bargain.

This program takes the cash price of the item, the amount and number of payments, the normal or average annual interest rate charged by banks and other lenders, the compounding period, and the number of payments per year and offers a suggestion as to

whether you should buy the product on credit.

A completely neutral option would be a time payment total that exactly equals the cash price plus interest. In this case, it wouldn't matter financially which plan you used, commercial loan or time payment plan. In that situation, this program's answer would be \$0.00.

Examples

	Your	
Program	response	,
Enter cash purchase price? Enter amount of payments? Total number of payments? Number of payments per year? Enter annual interest rate %? Compounded how many times a year? Pay cash for the item; the interest rate is too high. You are being charged	1000 25 100 12 18 12	
\$290.62 above the cost of the		
item plus interest. Press <enter> to continue, M for Menu</enter>		

$\underline{72-60~Business~Applications~Programs~/~TRS-80~Model~100}$

Enter cash purchase price?	6500
Enter amount of payments?	150
Total number of payments?	48
Number of payments per year?	12
Enter annual interest rate %?	5.25
Compounded how many times a year?	12
Accept the time payment offer. You would	
pay \$18.48 less than the cost of	
the item plus interest if you paid cash.	
Press <enter> to continue, M for Menu</enter>	

```
Line Numbers
  Ref
:03350: 3435
:03435: 3395
                3425
:09000: 3400
:10000: 3435
      : 3390
                3395
                       9000
                               9005
: C
        Compounding frequency
:CA
                3420
      : 3365
        Purchase price
:CP
      : 9005
                9015
        Compounds per payment
:IC
      : 9000
                9015
        Interest rate/compound period
:IP
      : 3410
                9020
        Interest per payment
:IR
      : 3385
               9000
        Annual interest rate
: N2
      : 3380
                3395
                       9005
        Number of payments per year
: N3
      : 3375
                3405
        Total number of payments
: P#
      : 3410
                       3425
                               3430
               3420
        Present value of time payments
:PQ
      : 3370
                3410
        Amount of payments
: Q V
      : 9015
                9020
        Effective interest rate
:U$
                3425
      : 3355
                        3430
        PRINTUSING format field
: X
      : 3405
                3415
                       9015
        Loop counter
```

Time Payment versus Purchase Program

```
3350 CLS:PRINT" COMPARING TIME PAYMENT
S TO PRICE": REM D3
3355 U$="$$#,#######.##"
3360 ' CHARGE IT AT MONTHLY PAYMENTS OF
# OR PURCHASE FOR ##
3365 INPUT"Enter cash purchase price"; CA
3370 INPUT"Enter amount of payments";PO
3375 INPUT"Total number of payments"; N3
3380 INPUT"Number of payments per year";
N 2
3385 INPUT"Enter annual interest rate %"
3390 INPUT"Compounded how many times a v
ear":C
3395 IF N2>C THENPRINT"YOU MAY NOT MAKE
MORE THAN ONE PAYMENT
                       PER INTEREST COMP
OUNDING PERIOD. PLEASE RE-ENTER":GOTO343
3400 GOSUB9000: 'FIND EFFECTIVE INTEREST
 RATE PER PAYMENT
3405 FOR X=N3 TO 1 STEP -1
3410 P#=(PO+P#)/(1+(IP/100)): 'MOVE BACK
ONE PMT
3415 NEXT X
3420 P#=P#-CA
3425 IF P#>0 THEN PRINT"Pay cash for the
 item, the interest rate is too high.
ou are being charged: ": PRINTUSINGU$; P#;:
PRINT" above the cost of the":PRINT"item
 plus interest.":GOTO3435
3430 PRINT"Accept the time payment offer
. You wouldpay ";:PRINTUSINGU$;ABS(P#);:
PRINT" less than the cost of the item pl
us interest if you pay cash."
3435 GOSUB10000:RUN3350
9000 IC=(IR/C)/100: 'INTEREST RATE PER CO
MPOUNDING PERIOD
9005 CP=C/N2: COMPOUNDS PER PAYMENT
9010 'FIND EFFECTIVE INTEREST RATE FOR C
2 PERIODS
9015 OV=1:FOR X=1 TO CP:OV=OV+(OV*IC):NE
XT
```

9020 IP=(QV-1)*100: 'IP=INTEREST PER PAYM ENT 9025 RETURN 10000 PRINT@281, "Press <ENTER> to contin ue, M for MENU"; 10005 A \$ = I NKEY\$: IFA\$ = "M"ORA\$ = "m"THE NMAXF ILES=0:CLEARO:MENUELSEIFA\$<>CHR\$(13)THEN 10005ELSERETURN

TOTAL INTEREST PAID ON A LOAN

When borrowing money, you need to determine exactly how much the loan is actually going to cost you. This program takes the amount of the loan, the number of payments per year, the total number of payments, the annual interest rate, and the compounding period and calculates how much money you are paying above the loan amount.

Examples

Program	Your response	e
Enter amount of loan?	10000	
Total number of payments?	36	
Number of payments per year?	12	
Enter annual interest rate %?	12	
Compounded how many times a year?	12	
Total interest charge is \$1,956.74		
Press <enter> to continue, M for Menu</enter>		
Enter amount of loan?	7798	
Total number of payments?	48	
Number of payments per year?	12	
Enter annual interest rate %?	9.8	
Compounded how many times a year?	12	
Total interest charge is \$1,677.26		
Press < ENTER > to continue. M for Menu		

```
Line Numbers
  Ref
:03450: 3545
:03495: 3515
                3520
:03530: 3510
                3520
:03545: 3525
:09000: 3485
:10000: 3545
                        9005
      : 3475
                9000
: C
        Compounding frequency
:CP
                9015
      : 9005
         Compounds per payment
                9015
: I C
       : 9000
         Interest rate/compound period
       : 3500
                9020
:IP
         Interest rate per payment
                9000
:IR
       : 3470
         Annual Interest
       : 3465
                9005
: N2
         Number of payments per year
                3490
                       3495
       : 3460
: N3
         Total number of payments
                        3515
                                3520
: P#
       : 3500
                3510
         Miscellaneous variable
       : 3510
         Miscellaneous variable
                                      3530
                        3515
                                3520
       : 3490
                3500
: PQ
         3535
                 3540
         Interest charge
                        3515
                                3520 3535
:PV
       : 3455
                3490
         Present value
                         3520
:QQ
       : 3480
                 3515
         Rate increment
       : 9015
                 9020
: Q V
         Used for interest calculations
                         9015
       : 3495
                 3505
         Loop counter
```

Total Interest Paid on a Loan Program

```
3450 CLS:PRINT"TOTAL AMOUNT OF INTEREST
PAID ON A LOAN": REM D4
3455 INPUT"Enter amount of loan";PV
3460 INPUT"Total number of payments"; N3
3465 INPUT"Number of payments per year";
N 2
3470 INPUT"Enter annual interest rate %"
:IR
3475 INPUT"Compounded how many times a y
ear";C
3480 \ QQ = .1
3485 GOSUB9000: 'FIND EFFECTIVE INTEREST
 RATE PER PAYMENT
3490 PO=PV/N3
3495 FOR X=N3 TO 1 STEP -1
3500 P#=(PO+P#)/(1+(IP/100))
3505 NEXT X
3510 IFINT(P#*100)=PP*100 THEN 3530
3515 IF P#<PV THEN PQ=PQ+(PQ*QQ):P#=0:G0
T03495
3520 IF P#>PV THEN QQ=QQ*.1:PQ=PQ-(PQ*(Q
Q*10)):P#=0:IF QQ<.0001 THEN 3530 ELSE G
OTO 3495
3525 GOTO3545
3530 PQ=PQ*N3: 'TOTAL AMT PAID
3535 PQ=PQ-PV: 'TOTAL INTEREST PAID
3540 PRINTUSING"Total interest charge is
 $$#,######.##";PQ
3545 GOSUB10000:RUN3450
9000 IC=(IR/C)/100: 'INTEREST RATE PER CO
MPOUNDING PERIOD
9005 CP=C/N2: COMPOUNDS PER PAYMENT
9010 'FIND EFFECTIVE INTEREST RATE FOR C
2 PERIODS
9015 QV=1:FOR X=1 TO CP:QV=QV+(QV*IC):NE
XΤ
9020 IP=(QV-1)*100: 'IP=INTEREST PER PAYM
ENT
9025 RETURN
10000 PRINT@281."Press <ENTER> to contin
ue. M for MENU":
10005 A$=INKEY$:IFA$="M"ORA$="m"THENMAXF
ILES=0: CLEARO: MENUELSEIFA$<> CHR$ (13) THEN
10005ELSERETURN
```

CONVERTING ADD-ON INTEREST TO ANNUAL INTEREST

Sometimes, instead of using annual interest rates, you are faced with add-on interest. Add-on is actually very simple: just multiply the total amount financed by the add-on rate. This is the amount paid each year for interest. If the loan runs for several years, the interest paid each year is the same. Thus, each payment includes the same fixed amount of money to cover interest.

However, because add-on interest is a fixed amount of each payment, the actual annual interest rate is different. This program takes the financed amount, number of payments, payments per year, and add-on interest rate and calculates what that actually comes to as an annual interest rate.

Examples

	Your
Program	response
T2 4 41 6' 19	9000
Enter the amount financed?	2000
Total number of payments?	12
Number of payments per year?	12
Enter add-on interest?	6
Interest rate is .920% per period,	
11.04% per year, compounded 12 times a	
year.	
Press <enter> to continue, M for Menu</enter>	
Enter the amount financed?	4000
Total number of payments?	24
Number of payments per year?	4
Enter add-on interest?	5
Interest rate is 2.220% per period,	
8.88% per year, compounded 4 times a	
year.	
Press <enter> to continue, M for Menu</enter>	

```
Ref
                              Line Numbers
+----+
:03550: 3630
:03595: 3605
:03610: 3595
:03630: 3620
:03635: 3590
                3605
:10000: 3630
:AR
     : 3575
                3580
        Add-on interest
:IA
      : 3570
                3575
        Add-on interest rate
:IC
     : 3585
               3600
                      3610
                               3615
        Interest rate/compounding period
:IP
     : 3585
                3600
                       3610
                               3615
        3625
                3640
        Interest rate per payment
: N2
      : 3565 3575
                       3625
        Number of payments per year
: N3
      : 3560
                3575
                       3580
        Total number of payments
: P#
      : 3585
                3595
                       3605
                               3640
        Miscellaneous variable
:PQ
     : 3580
               3640
        Miscellaneous variable
:PV
     : 3555
               3575
                       3580
                             3595
       Present value
: T
     : 3585
               3610
        Loop counter
: X
      : 3635
                3645
        Loop counter
```

Converting Add-on Interest to Annual Interest Program

```
3550 CLS:PRINT" CONVERT ADD-ON INTEREST
TO ANNUAL RATE": REM D5
3555 INPUT"Enter the amount financed";PV
3560 INPUT"Total number of payments"; N3
3565 INPUT"Number of payments per year";
N 2
3570 INPUT"Enter add-on interest"; IA
3575 AR=PV*(IA/100)*(N3/N2): 'ADD ON INTE
REST
3580 PQ=(PV+AR)/N3: 'PQ=MONTHLY PAYMENTS
3585 IP=0:IC=1:FORT=1 TO 3:P#=1
3590 GOSUB3635
3595 IFP#<PV THEN 3610
3600 IP=IP+IC
3605 P#=1:GOSUB 3635:GOTO 3595
3610 IP=IP-IC:IC=IC/10:NEXT T
3615 IC=IC*10:IP=IP+IC
3620 IF IP<0 THEN PRINT"DATA ERROR. PLEA
SE CHECK YOUR VALUES. ": GOTO3630
3625 PRINTUSING"Interest rate is ###.###
                 ###.##% per year, compou
% per period.
nded ### times ayear."; IP; IP*N2; N2
3630 GOSUB10000:RUN3550
3635 FOR X=N3TO 1 STEP -1
3640 P#=(PQ+P#)/(1+(IP/100)): 'MOVE BACK
ONE PMT
 3645 NEXT X:RETURN
10000 PRINT@281, "Press <ENTER> to contin
 ue. M for MENU":
10005 A $ = I NKEY $ : I F A $ = "M"ORA $ = "M"THE NMAXF
ILES=0: CLEARO: MENUELSEIFA$ <> CHR$ (13) THEN
 10005ELSERETURN
```

LOAN REPAYMENT AND REBATE

In the world of high finance, you meet all sorts of people. One of these is Jack the Shark, a lender Mark once met. The last we heard, business for Jack was booming, his loan policy being simple:

"Ya borrow a hunnert dollars now.

"Ya pay me a hunnert next month.

"Ya pay me another hunnert next month, an' we're even."

That worked until an innocent named Lee P. Slicker wanted to pay off his loan after only three weeks. Because he was using Jack's money for a shorter period of time, he figured he needed to repay a lesser amount.

Lee gave Jack \$150. Fortunately, Jack had a payment rule to cover this situation. He called it the *Knuckle Sandwich Rule*.

Banks and lending institutions have a different method of getting you to take a beating if you want to pay off your loan early, called the *Rule of Seventy-eights*.

Every businessperson is likely to reach a point at which he or she must consider the advantages and disadvantages of paying off a loan early. This program takes the basic information about a loan (the original loan amount, annual interest rate, original number of loan payments, and number of payments made so far and their amount) and uses the Rule of Seventy-eights to calculate the amount of money you'll save on interest (an interest rebate) and the amount of money needed to pay off the loan. Add-on annual interest is used.

Examples

	our
Program	sponse
Enter original loan amount? 50	00
Enter annual interest rate? 5	
Enter original number of loan	
payments?	
Number of payments made?	
Enter amount of payments? \$1	59.72

Your interest rebate is: \$172.30 The payoff amount is \$2,702.66. Press <ENTER> to continue, M for Menu

Enter original loan amount?	6500
Enter annual interest rate?	18
Enter original number of loan	
payments?	36
1 0	25
Number of payments made?	
Enter amount of payments?	\$175.00
Your interest rebate is: \$289.86	
The payoff amount is \$1,635.14.	
Press < ENTER > to continue. M for Menu	

```
Ref
                               Line Numbers
+----+
:03650: 3710
:10000: 3710
:IR
      : 3660
                3690
        Interest rate
: P0
      : 3705
                3710
        Payoff amount
:PV
      : 3655
                3690
                        3695
        Present value
:RB
      : 3695
                3700
                        3705
        Rebate
: X 0
      : 3665
                3680
                        3690
                                3695
        Number of payments
: X1
      : 3670
                3675
                        3680
                                3695
                                       3705
        Period
:X2
      : 3685
                3705
        Amount of payment
```

Loan Repayment and Rebate Program

```
3650 CLS:PRINTTAB(7)"LOAN REPAYMENT AND
REBATE": PRINTTAB(12) "BY RULE OF 78'S": RE
M D6
3655 INPUT"Enter original loan amount"; P
3660 INPUT"Enter annual interest rate"; I
3665 PRINT"Enter original number of loan
": INPUT" payments"; XO
3670 INPUT"Number of payments made"; X1
3675 X1=X1+1: LOAN IS IN THE X1 TH PERI
OD
3680 \times 1 = \times 0 - \times 1
3685 INPUT"Enter amount of payments"; X2
3690 PV = PV * (IR/100) * (X0/12)
3695 RB=PV*(X1+1)*X1/(X0+(X0*X0))
3700 PRINTUSING"Your interest rebate is
$$#,########;RB;:PRINT"."
3705 PO = (RB - (X2*(X1+1)))*-1
3710 PRINTUSING"The payoff amount is $$#
.#######.## .";PO:GOSUB10000:RUN3650
10000 PRINT@281, "Press <ENTER> to contin
ue, M for MENU";
10005 A $ = I NKEY $ : I F A $ = "M" OR A $ = " m" THE NMAXF
ILES=0: CLEARO: MENUELSEIFA$ <> CHR$ (13) THEN
10005ELSERETURN
```

PURCHASE VERSUS LEASE

When acquiring company equipment, you frequently must decide whether it's better to buy the equipment outright or lease it. If you purchase, it's assumed that you will borrow money at current rates, maintain the equipment, and salvage it at the end of its useful lifespan. The lease assumes that you won't be paying the maintenance or getting the salvage.

This program compares the present values of the two alternatives and makes a recommendation as to the best course of action. For example, assume you are interested in acquiring the use of a

car, which you may either purchase or lease.

The purchase price is \$5,000. Your down payment would be \$1,000, and you would finance \$4,000 with a 36-month loan, on which you would pay interest of 12 percent per year, compounded monthly. Maintenance would cost \$15 per month. The salvage value would be \$2,500.

On the other hand, a 36-month lease that includes mainte-

nance would cost you \$115 per month.

Assume that banks are currently paying 5 percent annual interest.

Would it be better to lease the car, or buy it?

Example

Program	$Your \\ response$
Amount to be loaned for purchase (not	
including down payment)?	4000
Total number of payments?	36
Number of payments per year?	12
Enter annual interest rate (%) charged	
on loans?	12
Enter annual interest rate (%) you can	
earn?	5
Compounded how many times a year?	12
Enter down payment?	1000
Enter resale or salvage value?	2500
Maintenance costs per month?	15
Enter lease monthly payments?	115

Loan payments are \$132.85 Present values are: Purchase value is \$3,780.77 Lease value is \$3,853.04 Recommendation: Purchase it. Press <ENTER> to continue, M for Menu

```
Ref
                                 Line Numbers
 :03750:
          3995
 :03825:
         3845
                  3850
:03855:
         3840
:03860:
         3850
:09000:
         3815
                  3860
:10000:
         3995
: C
         3785
                  3875
                          9000
                                  9005
         Compounding frequency
:CP
       : 9005
                  9015
         Compound periods per payment
: DN
       : 3790
                 3900
         Down payment
: F V
       : 3910
                 3920
                         3930
:
         Future value
:IC
       : 9000
                 9015
         Interest rate/compound period
: IE
       : 3780
                 3875
         Bank interest rate
:IP
       : 3830
                 3875
                         3890
                                 3920
                                         3965
         9020
         Interest per payment
:IR
       : 3775
                 9000
         Annual loan interest rate
:LE
       : 3805
                 3950
         Lease payments
: MA
       : 3800
                 3870
         Maintenance costs
: N2
       : 3770
                 9005
         Number of payments per year
: N3
       : 3765
                 3820
                         3825
                                 3885
                                         3915
         3960
         Total number of payments
: P#
       : 3830
                 3840
                         3845
                                 3850
                                         3880
         3890
                 3900
                         3955
                                 3965
                                         3975
         Used in principal calculations
: PQ
       : 3820
                 3830
                         3845
                                 3850
                                         3865
         3870
                 3890
                         3950
                                 3965
                                         3975
         Miscellaneous variable
:PV
      : 3760
                 3820
                         3840
                                 3845
                                         3850
         3900
                 3905
                         3930
                                 3935
                                         3975
         3980
                 3990
```

```
Present value, amount borrowed 3810 3845 3850
      : 3810
                 3845
: QQ
         Miscellaneous variable
      : 9015
                 9020
: Q V
         Effective interest rate
:SV
      : 3795
                 3910
         Salvage value
                 3945
                         3980
: U$
      : 3755
         PRINTUSING format field
                                 3895
       : 3825
                 3835
                         3885
                                         3915
: X
         3925
                 3960
                         3970
       : 9015
         Loop counter
       : 3905
                 3935
                         3945
                                 3990
: X O
         Effective interest rate
```

Purchase versus Lease Program

```
3750 CLS:PRINTTAB(6)"LOAN REPAYMENT AND
REBATE": PRINTTAB(12) "BY RULE OF 78'S": PR
INTTAB(11) "PURCHASE OR LEASE": REM D7
3755 U$="$$#,######.##"
3760 INPUT"Amount to be loaned for purch
ase (not
           including down payment)";PV
3765 INPUT"Total number of payments"; N3
3770 INPUT"Number of payments per year";
N 2
3775 INPUT"Enter annual interest rate (%
) charged on loans": IR
3780 INPUT"Enter annual interest rate (%
) you can
           earn"; IE
3785 INPUT"Compounded how many times a y
3790 INPUT"Enter down payment"; DN
3795 INPUT"Enter resale or salvage value
":SV
3800 INPUT"Maintenance costs per month";
MA
3805 INPUT"Enter lease monthly payments"
; LE
3810 00=.1
3815 GOSUB9000: FIND EFFECTIVE INTEREST
RATE PER PAYMENT
3820 PO=PV/N3
3825 FOR X=N3 TO 1 STEP -1
3830 P#=(PQ+P#)/(1+(IP/100))
3835 NEXT X
3840 IFINT(P#*100)=PV*100 THEN 3860
3845 IF P# < PV THEN PQ = PQ + (PQ * QQ) : P# = 0 : GO
T03825
3850 IF P#>PV THEN QQ=QQ*.1:PQ=PQ-(PQ*(Q
Q*10)):P#=0:IF QQ<.0001 THEN 3860 ELSE G
OTO 3825
3860 GOSUB9000
3865 CLS:PRINTUSING"Loan payments are $$
#,####.##";PQ
3870 PO=PO+MA: 'ADD MAINTENANCE TO MONTHL
Y LOAD PAYMENTS
3875 IP=IE/C
3880 P#=0
3885 FOR X=N3 TO 1 STEP -1
```

```
3890 P#=(PQ+P#)/(1+(IP/100))
3895 NEXT X
3900 PV = P# + DN
3905 \times 0 = PV
3910 FV=SV
3915 \text{ FOR } X = 1 \text{ TO } N3
3920 \text{ FV=FV/((IP/100)+1)}
3925 NEXT X
3930 PV=FV
3940 PRINT"Present values:"
3945 PRINT"Purchase = ";:PRINTUSINGU$;X0
3950 PO=LE
3955 P#=0
3960 FOR X=N3-1TO 1 STEP -1
3965 P#=(PQ+P#)/(1+(IP/100)): 'MOVE BACK
ONE PMT
3970 NEXT X
3975 PV=P#+PQ
3980 PRINT"Lease
                    = ";:PRINTUSINGU$;PV
3985 PRINT"Recomendation: ";
3990 IF XO<PV THEN PRINT"Purchase it." E
LSE PRINT"Lease it.
3995 GOSUB10000:RUN3750
9000 IC=(IR/C)/100: 'INTEREST RATE PER CO
MPOUNDING PERIOD
9005 CP=C/N2: 'COMPOUNDS PER PAYMENT
9010 'FIND EFFECTIVE INTEREST RATE FOR C
2 PERIODS
9015 QV=1:FOR X=1 TO CP:QV=QV+(QV*IC):NE
9020 IP=(QV-1)*100:'IP=INTEREST PER PAYM
ENT
9025 RETURN
10000 PRINT@281, "Press <ENTER> to contin
ue. M for MENU":
10005 AS=INKEYS:IFAS="M"ORAS="m"THENMAXF
ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
10005ELSERETURN
```

INSTALLMENT PLAN SCHEDULE

Some businesses offer a credit plan in which you're billed a varying amount. The amount charged consists of a fixed amount of the total owed plus the interest on the unpaid balance. Thus, the billings will slowly decline in amount as the interest charged decreases, because the unpaid balance is less each time.

This program takes the cost of the item, the interest charged per billing period, and the number of monthly payments to be made and generates a schedule listing each payment number and amount due.

Examples

	ur ponse
Cost of item?)
Interest rate as stated on the install-	
ment contract % per month on unpaid	
balance?	
Number of monthly payments?	
Print amount of all payments?	
Payment #1 = \$20.25	
Payment #2 = \$20.06	
Payment #3 = \$19.88	
Payment #4 = \$19.69	
Payment #5 = \$19.50	
Press <enter> to continue, M for Menu</enter>	
Payment #6 = \$19.31	
Payment #7 = \$19.13	
Payment #8 = \$18.94	
${\$156.75}$	
Press <enter> to continue, M for Menu</enter>	
Cost of item?	0
Interest rate as stated on the install-	
ment contract % per month on unpaid	
balance?	
Number of monthly payments? 12	

Print amount of al	l payments?	N
Print amount of w		5
Payment #5 = \$	317.73	
Print amount of al	l payments?	N
Print amount of w	hich payment?	12
Payment $#12 = $ \$	316.07	
Print amount of al	l payments?	Y
Payment $#1 = $ \$	318.68	
Payment $#2 = $ \$	318.45	
Payment #3 = \$	318.21	
Payment $#4 = $ \$	317.97	
	317.73	
Press < ENTE	R> to continue, M for Menu	
Payment $\#6 = \$$	317.50	
Payment $#7 = $ \$	317.26	
Payment #8 = \$	317.02	
Payment $#9 = $ \$	316.78	
Payment $#10 = $ \$		
Press < ENTE	R> to continue, M for Menu	
Payment #11 = \$	16.31	
Payment $#12 = $	16.07	
\$2	08.52	
Press < ENTE	R> to continue, M for Menu	

```
Line Numbers
 Ref
:04000: 4070
:04035: 4095
:04040: 4045
:04050: 4040
:04075: 4055
                4095
:04095: 4045
:10000: 4055
                4070
:B$
      : 4035
                4040
        Yes/No
                               4050
                                       4055
: N
      : 4025
                4030
                        4045
        Number of payments
                                       4085
                4045
                             4080
                        4055
:PM
      : 4040
        4095
        Payment
:PT
      : 4055
                4065
        Total payment
      : 4075
               4080
: X O
        Miscellaneous variable
: X4
      : 4015
                4020
                        4080
         Interest rate
                4075
                        4080
: X5
       : 4030
         Miscellaneous variable
      : 4005
              4030
                        4075
: X6
         Cost of item
: X8
       : 4080
         Miscellaneous variable
              4055
                        4075
                              4085
                                        4095
       : 4050
: Z
         Loop counter
```

Installment Plan Schedule **Program**

```
4000 CLS:PRINT" Credit Installment Plan
 Schedule": REM d8
4005 INPUT"Cost of item"; X6
4010 PRINT"Interest rate as stated on th
e install- ment contract % per month on
unpaid"
4015 INPUT"balance"; X4
4020 \times 4 = \times 4/100
4025 INPUT"Number of monthly payments"; N
4030 \times 5 = \times 6 / N
4035 INPUT"Print amount of all payments
(Y/N)":B$
4040 IF LEFT$(B$,1)="n" OR LEFT$(B$,1)="
N" THEN INPUT"Print amount of which paym
ent no."; PM: ELSE 4050
4045 IF PM<1 OR PM>N THEN 4040 ELSE 4095
4050 CLS:FOR Z=1 TO N
4055 GOSUB 4075:PT=PT+PM:IFN>5THENIFINT(
Z/5)=Z/5THENGOSUB10000:CLS
4060 NEXT:PRINT"
_ #
                          "::PRINT USING"$$#
4065 PRINT"
.####### .##":PT
4070 GOSUB10000: RUN4000
4075 \times 0 = \times 6 - (Z \times X5)
4080 \times 8 = \times 0 + \times 5 : PM = \times 8 \times \times 4 + \times 5
4085 PRINT"payment #"; Z; "=";: PRINT USING
 "$$#\#####.##";PM
4090 RETURN
4095 Z=PM:GOSUB4075:GOTO4035
10000 PRINT@281."Press <ENTER> to contin
ue. M for MENU";
10005 A$=INKEY$:IFA$="M"ORA$="m"THENMAXF
ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
10005ELSERETURN
```

CAPITAL ASSET PRICING MODEL

When dealing with stocks and investments, you must try to determine just how much return on investment you can get. One method of making such a determination is to use the Capital Asset Pricing Model. This model uses the expected rate of return on a portfolio of stocks and securities, a risk-free rate of interest, and a volatility factor to calculate the expected return rate. The volatility factor is a measure of the degree of responsiveness of the stock in question relative to that of the entire portfolio.

This program requires that you enter a risk-free rate of return, the expected rate of return of the portfolio (based on previous performance), and the volatility factor of the individual stock in question.

Program	Your $response$
Enter risk-free rate of annual	
interest (%)?	6
Enter expected rate of return %?	10
Volatility of return?	1.2
Expected rate of return = 10.80%	
using the formula $E(Ri) = Rf + [E(Rm) - Rf]b$	
Where E(Ri) = Expected rate of return	
Rf = Risk-free rate of interest	
E(Rm) = Expected return	
b = Volatility of return	
Press <enter> to continue, M for Menu</enter>	

Enter risk-free rate of annual	
interest (%)?	3
Enter expected rate of return %?	6
Volatility of return?	1.8
Expected rate of return = 8.40%	
using the formula $E(Ri) = Rf + [E(Rm) - Rf]b$	
Where $E(Ri) = Expected rate of return$	
Rf = Risk-free rate of interest	
E(Rm) = Expected return	
b = Volatility of return	
Press <enter> to continue, M for Menu</enter>	

```
Line Numbers
 Ref
:04100: 4155
:10000: 4155
    : 4115
              4120
       Volatility factor
              4120
   : 4105
:RF
       Annual Interest rate
             4125
    : 4120
:RI
       Expected rate of return
:RM : 4110 4120
       Expected return percentage
```

Capital Asset Pricing Model Program

4100 CLS:PRINTTAB(7)"CAPITAL ASSET PRICI NG MODEL": REM D10 4105 PRINT"Enter risk free rate of annua 1":INPUT"interest %":RF 4110 INPUT"Enter expected return %";RM 4115 INPUT"Volatility of return"; B 4120 RI=RF+(RM-RF)*B 4125 CLS:PRINTUSING"Expected rate of ret urn = ####.##,";RI 4130 PRINT "using the formula E(Ri)=Rf+[E(Rm)-Rf]b" 4135 PRINT "Where E(Ri)=Expected rate of return" 4140 PRINTTAB(7) "Rf=Risk-free rate of in terest" 4145 PRINTTAB(7)"E(Rm)=Expected return" 4150 PRINTTAB(7)"b=Volatility of return" 4155 GOSUB10000:RUN4100 10000 PRINT@281."Press <ENTER> to contin ue, M for MENU"; 10005 AS=INKEYS:IFAS="M"ORAS="m"THENMAXF ILES=0:CLEARO:MENUELSEIFA\$<>CHR\$(13)THEN 10005ELSERETURN

CASH MANAGEMENT MODEL

Most business checking accounts don't pay interest, and even a mediocre accountant would rather die than allow large amounts of money to sit idle. The formula used in this program was designed to let you determine the trigger points in your checking account. Reaching the lower limit means you should transfer money from your investment account to the cash account. Reaching the upper limit means you should transfer money out of the cash account into your investment account. To make things more complex, financial institutions usually charge a fee for transferring money from an interest-paying account to a checking account or vice versa, so you have to balance the lost revenues of excess money in the checking account against the cost of transferring additional monies into the account when you need to pay bills. The whole idea is to have your cake and eat it, too.

The program determines these two limits from the bank transferral fee, the minimum cash balance allowed by the bank, the variance of daily changes in the cash balance, and the annual interest rate and number of compounding periods in a year.

Your $response$
25
10000
100000
9
365

Press <ENTER> to continue, M for Menu Transfer money from the cash account to the investment account when the balance reaches \$15,899.36.

Press <ENTER> to continue, M for Menu

Enter cost of transferring money from	
the cash account to the investment	
account?	50
Enter the minimum cash balance allowed	
by the bank?	5000
Enter variance of daily changes in the	
cash balance?	200000
Annual interest rate?	10.91
How many compounds per year?	365
Should the balance in the cash account	
reach zero (or the minimum balance)	
allowed by the bank, transfer	
\$5,630.73 from the investment	
account.	
D CHAMBED to continue M for Money	

Press <ENTER> to continue, M for Menu Transfer money from the cash account to the investment account when the balance reaches \$6,892.19.

Press <ENTER> to continue, M for Menu

```
Ref
                             Line Numbers
+----+
:04200: 4280
:10000: 4265
               4280
: B
     : 4210
             4240
        Money transference cost
: C
      : 4230
              4235
        Compound periods per year
: I
     : 4235
               4240
        Interest rate/compounding period
:IA
     : 4225
             4235
        Annual interest rate
: MB
     : 4215
               4255
        Minimum cash balance
: 02
      : 4220
               4240
        Variance
:RP
      : 4240 4245
                      4255
                              4275
        Transfer amount
```

Cash Management Model Program

```
4200 CLS:PRINTTAB(7)"CASH MANAGEMENT MOD
EL": REM d11
4205 PRINT"Enter cost of transferring mo
ney from
           the cash account to the inves
tment"
4210 INPUT"account":B
4215 INPUT"Enter the minimum cash balanc
e allowed by the bank"; MB
4220 INPUT"Enter variance of daily chang
es in the cash balance";Q2
4225 INPUT"Annual interest rate"; IA
4230 INPUT"How many compounds per year";
4235 I = (IA/C)/100
4240 RP = 3*B*02/(4*I)
4245 RP=RP^{(1/3)}
4250 CLS:PRINT"Should the balance in the
               reach zero (or the minimu
 cash account
               allowed by the bank, tran
n balance)
sfer"
4255 PRINTUSING"$$#:#########";RP+MB;
4260 PRINT" from the investment":PRINT"a
ccount."
4265 GOSUB10000:CLS
4270 PRINT"Transfer money from the cash
account to the investment account when t
he balance reaches ";
4275 PRINT USING"$$#,########;(RP*3)+
4280 GOSUB10000:RUN4200
10000 PRINT@281."Press <ENTER> to contin
ue. M for MENU";
10005 AS=INKEYS:IFAS="M"ORAS="m"THENMAXF
ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
10005ELSERETURN
```

PRICE BEFORE SALES TAX

This program uses the total price paid for an item and the sales tax rate to calculate the original retail price. In other words, if you purchased an item for \$1,000, tax included, what did the item cost before tax?

Program	Your response
Enter total price paid? Enter sales tax? Purchase price without sales tax is	1000 7
\$934.58 Total tax is \$65.42 Press <enter> to continue, M for Menu</enter>	
Enter total price paid? Enter sales tax? Purchase price without sales tax is \$1,818.18 Total tax is \$181.82 Press <enter> to continue, M for Menu</enter>	2000

```
Line Numbers
 Ref
+----+
:04300: 4330
:10000: 4330
                     4325
              4315
   : 4305
       Total price
                     4325
              4320
    : 4315
:SP
       Price without sales tax
:ST : 4310
              4315
        Sales tax
```

Price before Sales Tax Program

MARKUP (CALCULATING RETAIL PRICE)

Most items are sold on a cost-plus basis. A certain percentage, or markup, is applied to the wholesale price, or cost, to determine the selling price.

If you paid \$2,000 wholesale for the item and have a policy of marking up your products by 45 percent, what is the selling price?

Program	Your response
Enter cost of good? Enter markup %? Selling price is \$2,900.00 Press <enter> to continue, M for Menu</enter>	2000 45
Enter cost of good? Enter markup %? Selling price is \$2,000.00 Press <enter> to continue, M for Menu</enter>	1000 100

Ref			Line	Numbers
++				
:04350:	4370			
:10000:				
	4355	4365		
:		of goods		
	4360	4365		
:		ent markup		
++				

Markup (Calculating Retail Price) Program

```
4350 CLS:PRINTTAB(15)"MARKUPS":PRINT:REM
M3
4355 INPUT"Enter cost of goods";C
4360 INPUT"Enter markup %";M
4365 PRINTUSING"Selling price is $$#,###
##.##";C+(C*(M/100))
4370 GOSUB10000:RUN4350
10000 PRINT@281, "Press <ENTER> to contin
ue, M for MENU";
10005 A$=INKEY$:IFA$="M"ORA$="m"THENMAXF
ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
10005ELSERETURN
```

COST BEFORE MARKUP

If you know the selling price and the markup, you can calculate the wholesale cost. If a competitor is selling your \$500 computer for \$200 and her markup is 45 percent, how much is she buying them for?

Program	Your $response$
Enter sales price?	200
Enter seller's markup?	45
Seller's cost is \$137.93	
Press <enter> to continue, M for Menu</enter>	
Enter sales price?	2000
Enter seller's markup %?	50
Seller's cost is \$1,333.33	
Press <enter> to continue, M for Menu</enter>	

Ref :04375: 4395 :10000: 4395 :M : 4385 4390 Markup :SP : 4380 4390 Sales Price Line Numbers

Cost before Markup Program

4375 CLS:PRINTTAB(10)"COST BEFORE MARKUP
":REM M4
4380 PRINT:INPUT"Enter sales price";SP
4385 INPUT"Enter seller's markup %";M
4390 PRINTUSING"Seller's cost is \$\$\;\##
###.\##";SP/(1+(M/100))
4395 GOSUB10000:RUN4375
10000 PRINT@281, "Press <ENTER> to contin
ue, M for MENU";
10005 A\$=INKEY\$:IFA\$="M"ORA\$="m"THENMAXF
ILES=0:CLEARO:MENUELSEIFA\$<>CHR\$(13)THEN

PERCENTAGE MARKUP

This program takes the cost and selling price of an item and calculates the percentage of markup over cost and percentage of retail price.

Program	Your $response$
Enter cost? Enter selling price? Markup of cost is 50.00% Profit margin is 33.33% Press <enter> to continue, M for Menu</enter>	2000
Enter cost? Enter selling price? Markup of cost is 50.00% Profit margin is 33.33% Press <enter> to continue, M for Menu</enter>	1000 1500
Enter cost? Enter selling price? Markup cost is 25.00% Profit margin is 20.00% Press <enter> to continue, M for Menu</enter>	1000 1250

	, .				
Ref				Line	Numbers
++					
-:04400:	4435				
:10000:	4435				
: C :	4405	4415	4425		
•	Cost				
	4415	4420	4425	4430)
	Markup				
	4410	4415	4425		
•	Selling	price			

Percentage Markup **Program**

```
4400 CLS:PRINTTAB(15)"PERCENT MARKUP":RE
M M5
4405 PRINT: INPUT"Enter cost"; C
4410 INPUT"Enter selling price"; SP
4415 M = (SP/C) - 1
4420 PRINTUSING"Markup of cost is ###.##
%":M*100
4425 M=-1*((C/SP)-1)
4430 PRINTUSING"Profit margin is ###.##%
":M*100
4435 GOSUB10000:RUN4400
10000 PRINT@281, "Press <ENTER> to contin
ue, M for MENU";
10005 A$=INKEY$:IFA$="M"ORA$="m"THENMAXF
ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
10005ELSERETURN
```

DISCOUNTED PRICE

If an item is discounted 30 percent and it normally sells for \$2,000, what will you pay for it?

Program	Your $response$
Enter regular price?	2000
Enter discount %?	30
Sale price is \$1,400.00	
Press <enter> to continue, M for Menu</enter>	
Enter regular price?	3000
Enter discount %?	75
Sale price is \$750.00	
Press <enter> to continue, M for Menu</enter>	

Ref :04450: 4470 :10000: 4470

: 4460 4465 Discount :P : 4455 4465

Price

Line Numbers

Discounted Price Program

4450 CLS:PRINTTAB(10)"THE DISCOUNTED PRICE":REM M6
4455 PRINT:INPUT"Enter regular price";P
4460 INPUT"Enter discount %";D
4465 PRINTUSING"Sale price is \$\$#,#####
.##";P-(P*(D/100))
4470 GOSUB10000:RUN4450
10000 PRINT@281,"Press <ENTER> to continue, M for MENU";
10005 A\$=INKEY\$:IFA\$="M"ORA\$="m"THENMAXFILES=0:CLEARO:MENUELSEIFA\$<>CHR\$(13)THEN

PRICE BEFORE DISCOUNT

If an item is priced at \$2,000, including a 45 percent discount, what is the regular price?

Program	Your $response$
Enter discounted price? Enter discount %?	2000 45
Regular price is \$3,636.36 Press <enter> to continue, M for Me</enter>	enu
Enter discounted price?	1500
Enter discount %?	50
Regular price is \$3,000.00	
Press <enter> to continue, M for Me</enter>	enu

Price before Discount Program

4500 CLS:PRINTTAB(10) "PRICE BEFORE DISCO UNT": REM M8 4505 PRINT: INPUT "Enter discounted price" 4510 INPUT"Enter discount %";D 4515 PRINTUSING"Regular price is \$\$#,### ###.##";P/(1-(D/100)) 4520 GOSUB10000:RUN4500 10000 PRINT@281, "Press <ENTER> to contin ue, M for MENU"; 10005 A\$=INKEY\$:IFA\$="M"ORA\$="m"THENMAXF ILES=0:CLEARO:MENUELSEIFA\$<>CHR\$(13)THEN 10005ELSERETURN

PROFIT MARGIN

If you buy a product for resale at \$1,000, and want to have made a 45 percent profit after selling it, what retail price should it have? This program calculates selling price using desired profit.

Program	Your $response$
Enter cost of good? Enter desired profit margin %? Selling price is \$1,818.18 Press <enter> to continue, M for Menu</enter>	1000 45
Enter cost of good? Enter desired profit margin %? Selling price is \$4,000.00 Press <enter> to continue, M for Menu</enter>	2000 50

Ref		Line Numbers
++		
:04550:	4575	
:10000:		
	4555 4565	
:	Cost of item	
: M :	4560 4565	
:	Margin	
•	4565 4570	
:	Selling price	
++		

Profit Margin Program

```
4550 CLS:PRINTTAB(15)"PROFIT MARGIN":REM M9
4555 PRINT:INPUT"Enter cost of good";C
4560 INPUT"Enter desired profit margin %
";M
4565 SP=(C/(1-(M/100)))
4570 PRINTUSING"Selling price is $$#,###
###.##";SP
4575 GOSUB10000:RUN4550
10000 PRINT@281,"Press <ENTER> to continue, M for MENU";
10005 A$=INKEY$:IFA$="M"ORA$="m"THENMAXFILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
```

PIE CHART

This program draws a pie chart on the Model 100 display. First the program asks you how many data items you have (so it will know into how many pieces to divide the pie), and then it asks for the data items, one at a time. When you're finished entering the data, the program adds the numbers together to get the total. Then it calculates the percentage of the total pie each individual piece gets. With this information, the program draws a circle on the left side of your display and divides it into slices. Each slice is labeled sequentially starting with the letter a and progressing toward z. On the right side of the display, each data item is placed beside its corresponding label, and its percentage of the total pie is listed.

When you're finished with the chart, just press <ENTER> and the program will return you to BASIC. This is the only program that doesn't automatically rerun or return you to the menu.

Because of the various types of printers on the market and the fact that each has its own method of drawing graphics, we can draw the pie chart only on the display.

```
Ref
                                Line Numbers
 :04840: 4840
                  4925
:04850: 4815
                 4825
:04855: 4830
:04885: 4835
:04900: 4925
:04925: 4890
:04935: 4950
:04940: 4935
                 4945
:04945: 4815
:04950: 4950
:04955: 4815
: A
       : 4805
                 4855
                         4860
         Calculation variable
: A$
       : 4840
                 4870
                         4875
         Keyboard input
: B X
       : 4935
         X-variable
: B Y
       : 4935
         Y-variable
: DA(
       : 4825
                 4895
                         4900
                                 4965
                                         4975
         4980
         Data item
:FM$
       : 4885
                 4900
         PRINTUSING format field
: I
       : 4820
                 4825
                         4830
                                 4870
                                         4895
         4900
                 4910
                         4915
                                 4970
                                         4975
         4980
         Alphabetic character loop
: P2
       : 4810
                 4825
                         4830
                                 4950
         Value for PI
: W
       : 4895
                 4900
         Percent of total
: X
      : 4845
                 4850
                         4860
                                 4865
                                         4935
         4940
        Calculation variable (x-axis)
: X1
      : 4845
                4850
                         4860
                                 4865
                                        4935
         4940
        Calculation variable (y-axis)
: X4
      : 4815
               4855
```

			Calculation	variable		
: : X	5		4845 4945	4950		
	5	•		variable		
: : X	6	:	4825 4895	4970	4980	
:			Total data		4045	4050
: X	7	•	4815 4825	4830	4845	4850
		Ť	4855 4940	4945	4950	
:			Calculation	variable		
:)	9	•	4865 4875	4885	4900	4905
• ′	()	•	4910			
:			Print locati	on		
: ;	7	:	4805 4820	4895	4955	4965
	 		4970			
:			Number of da	ata items		
		_ +				

Pie Chart Program

```
4800 CLS:CLEAR500:PRINTTAB(15)"PIE CHART
 ":REM pie
 4805 DEFSNGA-Z
 4810 P2=3.1416*2
 4815 GOSUB4955:GOSUB4945:X7=0:GOSUB 4850
 : X4 = 0
 4820 FORI=1T0Z-1
 4825 X7=X7+P2*DA(I)/X6:G0SUB4850
 4830 GOSUB4855: NEXTI: X7=P2: GOSUB4855
 4835 GOSUB4885
4840 A$=INKEY$:IFA$=""THEN4840:ELSE END
4845 X=X5*SIN(X7)+45:X1=X5*COS(X7)*.9+32
 :PSET(X,X1):RETURN
4850 \ X=24*SIN(X7)+45:X1=24*COS(X7)*.9+32
:LINE(45,32)-(X,X1):RETURN
4855 A = X4 + (X7 - X4)/2 : X4 = X7
4860 X=33*SIN(A)+45:X1=33*COS(A)*.9+32
4865 \times 9 = (X1 \setminus 8) * 40 + (X \setminus 6)
4870 A$=CHR$(96+I)
4875 PRINT@X9,A$;
4880 RETURN
4885 X9=16:FM$="### ##.#%"
4890 ON ERROR GOTO 4925
4895 FOR I=1TOZ:W=DA(I)/X6*100.
4900 PRINT@X9, USING FM$; CHR$(96+I); DA(I)
: W;
4905 \times 9 = \times 9 + 12
4910 IF I MOD 2=0 THEN X9=X9+16
4915 NEXT
4920 RETURN
4925 IF ERL=4900 THEN RESUME 4840
4930 ON ERROR GOTO O: RESUME
4935 BX=X:BY=X1:GOSUB4940:LINE(BX,BY)-(X
,X1):RETURN
4940 X=24*SIN(X7)+45:X1=24*COS(X7)*.9+32
:RETURN
4945 X5=24:X7=0:G0SUB4940
4950 GOSUB 4935: X7=X7+.3: IF X7<P2 THEN 4
950:ELSE X5=24:X7=0:G0SUB4935:RETURN
4955 INPUT"How many data items do you ha
ve":Z
4965 DIMDA(Z)
```

4970 X6=0:FORI=1TOZ 4975 PRINT"#";I;:INPUTDA(I)

4980 X6=X6+DA(I):NEXTI 4985 CLS:RETURN

ECONOMIC ORDER QUANTITY

One of the figures a businessperson must juggle is *inventory level*. It costs money to keep stock on hand; yet, the more units you buy, the lower the per-unit cost. This program takes the cost of placing an order, the units needed per period of time, and the cost of storage for the same amount of time and then calculates the most efficient quantity for you to order each time you reorder.

Program	Your response
Cost of placing an order?	25
Number of units needed per period?	1000
Per-period storage, warehousing, or	
carrying cost per unit (if any)?	2
Your order should be 158	
Press <enter> to continue, M for Menu</enter>	

```
Line Numbers
 Ref
:05000: 5040
:10000: 5040
:EQ
   : 5030 5035
      Units to order
   : 5005 5020
: X1
      Cost of placing order
:X2 : 5010 5020
     Number of units needed/period
Miscellaneous variable
```

Economic Order Quantity Program

5000 CLS:CLEAR500:PRINTTAB(10)"ECONOMIC ORDER QUANTITY": REM EOQ 5005 INPUT"Cost of placing an order"; X1 5010 INPUT"Number of units needed per pe riod"; X2 5015 INPUT"Per period storage, warehousi carrying costs per unit (if a ng, or ny)"; X3 5025 IFX3=0 THEN X3=.000001 5030 EQ=SQR(X4/X3)5035 PRINT"Your order shound be"; INT(EQ) :PRINT"units." 5040 GOSUB10000:RUN5000 10000 PRINT@281, "Press <ENTER> to contin ue, M for MENU"; 10005 A\$=INKEY\$:IFA\$="M"ORA\$="m"THENMAXF ILES=0:CLEARO:MENUELSEIFA\$<>CHR\$(13)THEN 10005ELSERETURN

BAR CHART

This program draws a bar chart on the basis of data you give it and stores the chart in RAM for your use in a text file or for printing out. Depending on whether you intend to print out the bar chart or include it in a text file, the type of bar chart is altered. If you're going to print it out, exclamation marks and dashes are used to delineate the chart boundaries. If you're just going to view it in RAM, then graphic symbols are used. Note: The graphic symbols wouldn't print on our printer, which substituted the letters z, o, u, and q instead. When you type in line 5295, which defines the graphic symbols, instead of pressing the lowercase z, press <GRPH><SHIFT>K. In place of the o, press <GRPH><SHIFT>C. For the lowercase u, use <GRPH> <SHIFT>:. And for the q, use $\langle GRPH \rangle \langle SHIFT \rangle P$.

The program asks you for the maximum value of the entries (the highest value of any of them), the increment, what the bottom line of the graph should read (the limit is 30 characters, where each character will have one value assigned to it), the name of the bar chart (limited to 9 characters), and then the values for each of the data items. When the last item is entered, the chart's filename is requested, and then the chart is drawn in RAM.

In the example below, the chart is named Sales/mth (sales per month), and the bottom line of the chart reads:

J J. M J. F M Α

The letters stand for the initials of the months January, February, March, April, May, June, and July. Each letter is followed by three blank spaces, representing three blank weeks. Thus, each monthly period is usually displayed as four weeks, each of which is prompted for its value by the program:

Program	$Your\ response$		
Value for J	20		
Value for	23		
Value for	25		
Value for	30		
Value for F	40		
Value for	45		
Value for	50		
Value for	50		

Value for M	55
Value for	60
Value for	60
Value for	60
Value for A	70
Value for	70
Value for	80
Value for	70
Value for M	60
Value for	50
Value for	40
Value for	45
Value for J	50
Value for	60
Value for	70
Value for	80
Value for J	90
Value for	95
Value for	90
Value for	90

When you've finished entering the data, type the filename under which you want the chart stored. When the *Press < ENTER > to continue*, *M for MENU* prompt appears, press the M key, and return to the menu. Now put the cursor over the chart's filename, and take a look at it. For the example I've used, the file looks like this:

100!		
90!		XXXX
80!	\mathbf{X}	XXXXX
70!	XXXX	XXXXXX
60!	XXXXXXX	XXXXXXX
50!	XXXXXXXXXXX	XXXXXXXX
40!	XXXXXXXXXXXXXXXX	XXXXXXXXX
30!	XXXXXXXXXXXXXXXXXXX	XXXXXXXXX
20!	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	XXXXXXXX
10!	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	XXXXXXXX

Sales/mth! J F M A M J J

Value for J 20 23 Value for 25 Value for Value for 30 Value for F 40 Value for 45 Value for 50 Value for 50 Value for M 55 Value for 60 Value for 60 Value for 60 Value for A 70 Value for 70 Value for 80 Value for 70 Value for M 60 Value for 50 Value for 40 Value for 45 Value for J 50 Value for 60 Value for 70 Value for 80 Value for J 90 Value for 95 Value for 90 Value for 90

Ref			Line	Numbers
:05050		5285		
:05070 :05125		5060 5075 5135		
:05140):	5145		
:05160 :05200):	5175 5180		
:05290		5065 5060 5065		
:10000):	5285		
:BL\$	•	5190 5290 5295 Print character		
:D\$(:	5095 5105 5110	5120	5150
•		5190 5240 5245 Columns of graph		
: D (:	5095 5170 5175 5270	5180	5185
•		Value for above		
:DA\$:	5120 5290 5295 Print character		
: 1\$:	5060 5065		
: : I C		Input character 5085 5090 5105	5180	5185
•		Increment	3100	3103
: L	:	5180 Calculation variable		
:LI\$:	5110 5150 5290	5295	
: MA	:	Print character 5070 5075 5090	5175	
: : MI		Maximum value 5080 5090 5175		
. 141.7	•	5080 5090 5175 Minimum value		
: N	:	5090 5095 5100 5235	5105	5190
•		Number of columns		
:PL\$:	5120 5290 5295 Print character		
X	:	5100 5105 5110	5120	5150
•		5155 5165 5170 5185 5190 5200	5175 5235	5180 5240
:		5245 5250 5255	5265	5270

```
5275
        Loop counter
: X $
                      5155
                              5165
     : 5135
               5150
        5255
               5265
        Bottom line of graph
      : 5145
               5150
: Y$
        Data description
      : 5185 5190 5195
: Z
        Counter
```

Bar Chart Program

```
5050 CLS:PRINTTAB(15) "BAR CHART": REM DAR
5055 CLEAR 2000
5060 INPUT"Do you intend to make a print
out (Y/N)"; I$: IFI$="N"ORI$="n"THENGOSUB5
295:GOT05070
5065 INPUT"Will your printer print graph
ics (Y/N)"; I$: IFI$="N"ORI$="n"THENGOSUB5
290 ELSE GOSUB5295
5070 INPUT"Maximum value of entries";MA
5075 IFMA>9999999 THENPRINT" value too hi
ah":GOTO5070
5080 MI = 0
5085 INPUT"Increment for graph
                                     ":IC
5090 N=INT((MA-MI)/IC)
5095 DIMD$(N+2),D(30)
5100 FORX=OTON-1
5105 D(X) = STR((N-X)*IC)
5110 D(X) = STRING((9-LEN(D(X))), "")+D
$(X)+LI$+STRING$(29," ")
5115 NEXT
5120 D$(X)=STRING$(9,DA$)+PL$+STRING$(29
,DA$)
5125 CLS
5130 PRINT"Bottom line to read (30 chrs.
 max):"
5135 INPUTX$: IFLEN(X$)>30THEN GOTO 5125
5140 PRINT"Data description (9 chrs. max
5145 INPUTY$: IFLEN(Y$)>9THEN5140
5150 D(X+1)=Y+STRING(9-LEN(Y), "")+L
I $+X$
5155 FORX=1TOLEN(X$)
5160 PRINT"Value for ";
5165 PRINTMID$(X$,X,1);
5170 INPUTD(X)
5175 IFD(X)>MAORD(X)<MITHENPRINT"Redo.":
G0T05160
5180 L=INT(D(X)/IC):IFL=OTHEN5200
5185 \text{ FORZ=}1TOINT(D(X)/IC)
5190 MID(D(N-Z), X+10, 1)=BL
5195 NEXTZ
5200 NEXTX
5205 INPUT"Filename of bar chart":FN$
5210 IF FNS=""THENFNS="bar"
```

```
5215 FN$=LEFT$(FN$,6)
5220 FN$="RAM:"+FN$+".do"
5225 PRINT"Chart will be saved as ";FN$
5230 OPEN FN$ FOR OUTPUT AS 1
5235 FORX=OTON+1
5240 PRINT#1,D$(X)
5245 PRINTD$(X)
5250 NEXTX
5255 FORX=1TOLEN(X$)
5260 PRINT#1, "Value for ";
5265 PRINT#1, MID$(X$, X, 1);
5270 PRINT#1.D(X)
5275 NEXTX
5280 CLOSE
5285 GOSUB10000: RUN5050
5290 PL$="+":BL$="X":LI$="!":DA$="-":RET
URN
5295 PL$="z":BL$="o":LI$="u":DA$="q":RET
URN
10000 PRINT@281, "Press <ENTER> to contin
ue. M for MENU";
10005 A $ = I NKEY $ : I F A $ = "M" OR A $ = "m" THE NMAXF
ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
10005ELSERETURN
```

Accountant's Helpers

The accountant has been described as the single most valuable professional in society today; in his or her clear understanding of the interrelationship of economic factors and solid grasp of the hyper-complex tax system, the accountant is said to be unmatched by any other professional. An accountant has also been described as someone who couldn't make it as a bookkeeper. Regardless, the programs in this chapter are some of the accountant's tools.

A whole field of accounting is dedicated to allocating costs fairly. If you make a product, you need to know exactly how much it costs to make. This allows you to price the product accurately and make an appropriate profit while being competitive on the open market. If, for example, you purchase a machine to make the product during the first year of your operation, is it fair to say that the product costs more to make in the first year (because of the cost of the machine) and less to make each following year? Of course not. If this were the case, then new businesses could never compete with existing firms. For this reason, we have an accounting tool called *depreciation*.

Depreciation allows a business to spread the cost of an item over several years, or until the machine breaks down and needs to be sold or disposed of. This way, even though your company pays for the machine during the first year, the tremendous burden of paying for it does not need to be passed on to the customers in full right away. It can be spread out over a period equal to that for which the machine is expected to be operable. This is referred to as depreciation and amortization.

Other accounting programs presented here deal with earnings per share calculations and investment yield.

141

DEPRECIATION

Whenever a business buys equipment, the accountant or executive in charge must decide how to handle the decline of its value over the useful lifespan of the item. For low-cost equipment, the best choice is to write off the entire cost as a business expense, subtracting the money from the gross profits and reducing the amount of tax liability the company faces at year's end.

With expensive purchases, many different options are available that let the company spread out the cost of the purchase over the lifespan of the equipment, thus reducing the company's tax liability in several different years.

All three depreciation programs listed here take the cost of the item and subtract the salvage value, which in some cases is little more than the value of the raw materials from which the item was made. This gives the actual cost of the purchase.

This section lists programs that calculate three kinds of depreciation (straight-line, sum-of-year's-digits, and declining) so you can see how each sort affects the tax write-off each year. The fourth program compares straight-line and declining depreciation, telling you which is better for a given item and suggesting when you should switch from one to the other for the best tax advantage.

STRAIGHT-LINE **DEPRECIATION**

The first program calculates straight-line depreciation. Simply take the purchase cost, subtract the salvage value, and divide by the lifespan of the item, in years.

To use the program, just give it the purchase price, salvage value, lifespan (in years), and purchase month and year. The program will calculate the first year's depreciation (the item may not receive a full year's service), the yearly depreciation, and the final year's depreciation (which may also be less than a full year). The total of the first year's and last year's depreciation should be the same as a full year's depreciation, within a few pennies.

Examples

Program	Your response
Purchase price? Salvage value? Life in years? Purchase month and year (MM/YY)? Depreciation from 02/01/80 to 12/31/80: \$2,495.37 Depreciation for remaining years: \$2,722.22 Depreciation from 01/01/89 to 02/01/89: \$226.85 Press <enter> to continue, M for Menu</enter>	25000 500 9 02/80
Purchase price? Salvage value? Life in years? Purchase month and year (MM/YY)? Depreciation from 09/01/83 to 12/31/83: \$37.50 Depreciation for remaining years: \$112.50 Depreciation from 01/01/91 to 09/01/91: \$75.00 Press <enter> to continue, M or Menu</enter>	1000 100 8 09/83

```
Line Numbers
 Ref
+----+
:02500: 2575
:02520: 2520
                2540
:02525: 2535
:10000: 2575
: C
      : 2510
                2545
        Purchase price
                        2565
                                2570
      : 2545
                2550
        Depreciation per year
      : 2555
                       2570
: D1
                2560
        First year's depreciation
                2530
:DD$
      : 2525
         Purchase date 2550 2555
: DM
      : 2550
        Depreciation per month
                        2570
                2545
: L
      : 2520
        Useful lifespan
                                2560
                                       2570
      : 2530
                2535
                        2555
: MM
        Purchase month
                2545
: S
      : 2515
         Salvage value
                2560
                        2565
                                2570
: U$
       : 2505
         PRINTUSING format field
                2540
                        2560
                              2570
:YY
       : 2530
         Purchase year
```

Straight-line Depreciation Program

```
STRAIGHT LINE DEPRECIA
2500 CLS:PRINT"
TION": REM B1
2505 U$="$$#,########"
2510 INPUT"Purchase price"; C
2515 INPUT"Salvage value"; S
2520 INPUT"Life in years";L:IF L<1 THEN
2520
2525 INPUT"Purchase month and year (MM/Y
Y)":DD$
2530 MM=VAL(LEFT$(DD$,2)):YY=VAL(RIGHT$(
DD$.2))
2535 IFMM<10RMM>12THEN2525
2540 PRINT: IFYY < OTHEN 2525
2545 D=(C-S)/L: DEPRECIATION PER YEAR
2550 DM=D/12: 'DEPRECIATION PER MONTH
2555 D1 = DM*(13-MM)
2560 PRINT"Depreciation from ";RIGHT$(ST
R$(MM),2);"/01/";RIGHT$(STR$(YY),2);" to
 12/31/";RIGHT$(STR$(YY),2);":":PRINTUSI
NGUS:D1
2565 PRINT"Depreciation for remaining ye
ars: ": PRINTUSINGU$; D
2570 PRINT"Depreciation from 01/01/";RIG
HT$(STR$(YY+L),2);" to ";RIGHT$(STR$(MM)
,2);"/01/";RIGHT$(STR$(YY+L),2);":":PRIN
TUSINGU$: D-D1
2575 GOSUB10000:RUN2500
10000 PRINT@281, "Press <ENTER> to contin
ue. M for MENU";
10005 A $ = I NKEY $ : I F A $ = "M"ORA $ = "m"THE NMAXF
ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
10005ELSERETURN
```

SUM-OF-YEAR'S-DIGITS DEPRECIATION

The sum-of-year's-digits method of depreciation multiplies the depreciable cost of the purchase by the ratio of the number of remaining years to the sum of all the years in the item's lifespan.

To use this program, just type in the lifespan of the asset, its cost, the purchase date, and the final salvage value. From this information, the program will create a display of each year's applicable depreciation. As in the previous program, the first and last years are not full years, but together add up to one year so that the entire time considered is a whole number of years.

Examples

Program		Your $response$
Life of asset in years? Cost of asset? Month and year purchased? Salvage value? Depreciation from		9 25000 02/80 500
02/01/80 to 12/31/80 is 01/01/81 to 12/31/81 is 01/01/82 to 12/31/82 is 01/01/83 to 12/31/83 is 01/01/84 to 12/31/84 is 01/01/85 to 12/31/85 is	\$4,491.67 \$4,400.93 \$3,856.48 \$3,312.04 \$2,767.59 \$2,223.15	
Press <enter> to cor 01/01/86 to 12/31/86 is 01/01/87 to 12/31/87 is 01/01/88 to 12/31/88 is 01/01/89 to 02/01/89 is Remaining salvage value is Press <enter> to con</enter></enter>	stinue, M for Menu \$1,678.70 \$1,134.26 \$589.81 \$45.37 \$500.00	

Life of asset in years? Cost of asset? Month and year purchased?	8 1000 09/83
Salvage value?	100
Depreciation from	
09/01/83 to 12/31/83 is \$66.67	
01/01/84 to 12/31/84 is \$191.67	
01/01/85 to 12/31/85 is \$166.67	
01/01/86 to 12/31/86 is \$141.67	
01/01/87 to 12/31/87 is \$116.67	
01/01/88 to 12/31/88 is \$91.67	
Press <enter> to continue, M for Menu</enter>	
01/01/89 to 12/31/89 is \$66.67	
01/01/90 to 12/31/90 is \$41.67	
01/01/91 to 09/01/91 is \$16.67	
Remaining salvage value is \$100.00	
Press <enter> to continue, M for Menu</enter>	

```
Line Numbers
 Ref
:02600:
        2725
:02625: 2630
                2635
:02730: 2665
                2710
:10000: 2710
                2725
: C
      : 2620
                2655
                        2690
                                2720
        Cost of asset
                2670
: D
      : 2655
        Depreciation Expense
                                2640
      : 2625
                2630
                        2635
: D$
        Purchase date
                2685
                        2690
: D1
      : 2675
        Yearly deprecitaion
                2675
      : 2670
                        2705
        Yearly depreciation
                 2650
                        2660
                                2670
                                        2690
      : 2615
: L
        Useful lifespan
      : 2640
                                2700
                                        2705
: MM
                2660
                        2675
        Month purchased
: P
                2705
      : 2675
        Miscellaneous variable
                2655
: S
      : 2645
         Salvage value
:SY
      : 2650
                2655
         Sum of years digits
                        2720
: U$
      : 2610
                2685
         PRINTUSING format field
                         2700
      : 2660
                 2680
: W
        Last month of depreciation
                         2700
      : 2665
                 2680
: X
         Year counter
      : 2660
                         2700
                 2665
: Y
         Year purchased
:YY
      : 2640
                 2680
         Year purchased
                         2695
       : 2660
                 2680
: 7
         Current printed month
```

Sum-of-Year's-Digits Depreciation Program

```
2600 CLS:PRINT"DEPRECIATION, SUM-OF-YEAR
'S DIGITS (SYD)":REM B2
2605 ' EXPENSE = (COST-SALVAGE)*((N+1-YR#
)/SUM OF YRS NOS.)
2610 U$="$$#.######.##"
2615 INPUT"Life of asset in years";L
2620 INPUT"Cost of asset":C
2625 INPUT"Month and year purchased (MM/
YY)";D$
2630 IF LEN(D$)<>5 THEN 2625
2635 IFVAL(LEFT$(D$,2))<10RVAL(LEFT$(D$,
2))>12THEN2625
2640 MM=VAL(LEFT$(D$,2)):YY=VAL(RIGHT$(D
$.2))
2645 INPUT"Salvage Value":S
2650 \text{ SY} = (L*(L+1))/2
2655 D = (C - S)/SY
2660 Y=L:Z=MM:W=12
2665 GOSUB2730:FOR X=0 TO Y
2670 F=L*D
2675 D1=F*((12-MM+1)/12)+P
2680 PRINTRIGHT$(STR$(Z),2);"/01/";RIGHT
$(STR$(YY+X),2);" to ";RIGHT$(STR$(W),2)
;"/31/";RIGHT$(STR$(YY+X),2);" is:
2685 PRINTUSINGU$;D1
2690 C=C-D1:L=L-1
2695 \ Z=1
2700 IF X=Y-1 THEN W=MM
2705 P=F*(1-((12-MM+1)/12))
2710 IF (X+1)/6 = INT((X+1)/6) THE NG 0 SUB 1000
0:GOSUB2730
2715 NEXT
2720 PRINT"Remaining Salvage value is";:
PRINTUSINGUS: C
2725 GOSUB10000:RUN2600
2730 CLS:PRINT"Depreciation from":RETURN
10000 PRINT@281, "Press <ENTER> to contin
ue. M for MENU":
10005 A$=INKEY$:IFA$="M"ORA$="m"THENMAXF
ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
10005ELSERETURN
```

DECLINING-BALANCE DEPRECIATION

This method of depreciation uses a fixed percentage of the current value of the asset as the amount to be deducted for the current year. As the value of the asset declines, so does the depreciation, but the percentage remains a constant.

The depreciation for a year is calculated by multiplying the value of the asset by a fixed percentage, usually 150 or 200 percent of the straight-line depreciation rate. The amount is then subtracted from the current value to give next year's current value.

One important fact needs to be pointed out: the depreciation doesn't stop at the end of the life of the asset. Instead, it is considered finished when the salvage value of the asset is reached. If these two events occur in the same year, or the item is fully depreciated before the end of the asset's lifespan, you're okay. If they don't, and the asset's lifespan will be reached before it has been fully depreciated, you should probably switch over to straight-line depreciation at the year when straight-line depreciation is more than declining-balance depreciation.

The next program, Straight-line versus Declining-Balance Depreciation, discusses this crossover in depreciation.

Examples

Program	Your $response$
Cost of asset? Enter factor percentage (150%, 200% or other)?	1000 150
Life of asset in years? Salvage value?	8 100
Date purchased (MM/YY)? Depreciation from	09/83
09/01/83 to 12/31/83 is \$62.50	
01/01/84 to 12/31/84 is \$175.78 01/01/85 to 12/31/85 is \$142.84	
01/01/86 to 12/31/86 is \$116.04 01/01/87 to 12/31/87 is \$94.29	
Press <enter> to continue, M for Menu</enter>	

01/01/88 to 12/31/88 is \$76.61 01/01/89 to 12/31/89 is \$62.24 01/01/90 to 09/31/90 is \$169.70 Remaining salvage value is \$100.00 Press <ENTER> to continue, M for Menu

Cost of asset?	25000
Enter factor percentage (150%, 200% or other)?	200
Life of asset in years?	9
Salvage value?	500
Date purchased (MM/YY)?	02/80
Depreciation from	
02/01/80 to 12/31/80 is \$5,092.59	
01/01/81 to 12/31/81 is \$4,423.87	
01/01/82 to 12/31/82 is \$3,440.79	
01/01/83 to 12/31/83 is \$2,676.17	
01/01/84 to 12/31/84 is \$2,081.46	
Press <enter> to continue, M for Menu</enter>	
01/01/85 to 12/31/85 is \$1,618.92	
01/01/86 to 12/31/86 is \$1,259.16	
01/01/87 to 12/31/87 is \$979.34	
01/01/88 to 02/31/88 is \$2,927.70	
Remaining salvage value is \$500.00	
Press <enter> to continue, M for Menu</enter>	

```
Line Numbers
 Ref
:02750: 2880
:02780: 2780
                2790
:02885: 2810
                2850
:10000: 2850
                2880
: C
      : 2760
                2795
         Asset cost
:D$
      : 2780
                2785
         Purchase date
                2830
                        2835
: D1
      : 2815
        Yearly deprecitaion
                2870
      : 2855
:DL
        Last year's depreciation
                2795
: F
      : 2765
         Depreciation factor
      : 2770
                2795
                        2805
                                2810
: L
        Useful lifespan
                2790
                        2800
                                2805
                                       2865
: MM
      : 2785
         Purchase month
      : 2775
                2875
: S
         Salvage value
                 2830
                        2870
                                2875
: U$
      : 2755
         PRINTUSING format field
                 2825
: W
       : 2805
         End month of depreciation
                        2825
                                        2860
       : 2810
                2820
                                2850
: X
         2865
         Year counter
       : 2795
                 2815
: XO
         Declining asset cost
: X1
       : 2800
                 2815
         Month factor
                 2845
: X2
       : 2800
         Reciprocal of X1
                 2815
: X4
       : 2795
         Depreciation factor per year
                 2835
: X5
       : 2795
                         2855
         Declining asset cost
: X6
       : 2815
                2845
```

Miscellaneous variable

:X7 : 2815 2845

Depreciation value

: 2805 : Y

: Remaining life :YY : 2785 2790 2820 2825 2860

2865

: Year purchased :Z : 2805 2820 2 2840 2860 Start month of depreciation

Declining-Balance Depreciation Program

```
2750 CLS:PRINT"DEPRECIATION - DECLINING
BALANCE METHOD": REM B3
2755 U$="$$#,######.##"
2760 INPUT"Cost of asset";C
2765 INPUT"Enter factor percentage (150%
  200%, or other)";F
2770 INPUT"Life of asset";L
2775 INPUT"Salvage value"; S
2780 INPUT"Date purchased (MM/YY)";D$:IF
 LEN(D$)<>5 THEN 2780
2785 MM=VAL(LEFT$(D$,2)):YY=VAL(RIGHT$(D
$,2))
2790 IFMM<10RMM>120RYY<0THEN2780
2795 \times 0 = C : \times 5 = C : \times 4 = (F/100)/L
2800 \text{ X1} = ((12 - \text{MM} + 1)/12) : \text{X2} = 1 - \text{X1}
2805 Y=L:Z=MM:W=12
2810 GOSUB2885:FORX=1TOL-1
2815 \times 7 = \times 0 \times \times 4 : \times 0 = \times 0 - \times 7 : D1 = \times 7 \times \times 1 + \times 6
2820 PRINTRIGHT$(STR$(Z),2);"/01/";RIGHT
$(STR$(YY+X-1),2);" to ";
2825 PRINTRIGHT$(STR$(W),2);"/31/";RIGHT
$(STR$(YY+X-1),2);" is:
2830 PRINTUSINGU$:D1
2835 X5=X5-D1
2840 Z=1
2845 X6 = X7 \times X2
2850 IF X = 5THENGOSUB10000: GOSUB2885
2855 NEXT:DL=X5-S
2860 PRINTRIGHT$(STR$(Z),2);"/01/";RIGHT
$(STR$(YY+X-1),2);" to ";
2865 PRINTRIGHT$(STR$(MM),2);"/31/";RIGH
T_{STR}(YY+X-1),2); is: ";
2870 PRINTUSINGU$; DL
2875 PRINT"Remaining salvage value is";:
PRINTUSINGU$; S
2880 GOSUB10000:RUN2750
2885 CLS:PRINT"Depreciation from":RETURN
10000 PRINT@281, "Press <ENTER> to contin
ue, M for MENU";
10005 AS=INKEYS:IFAS="M"ORAS="m"THENMAXF
ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
10005ELSERETURN
```

STRAIGHT-LINE VERSUS DECLINING-BALANCE DEPRECIATION

The previous program mentioned a flaw with using the decliningbalance depreciation method: it's possible to reach the end of the asset's lifespan before the asset has been fully depreciated.

This program takes the declining-balance factor and lifespan, salvage value, and cost of the asset and tells you in which year of the depreciation schedule you should switch over to straight-line depreciation.

Examples

Program	Your response
Life of asset? Salvage value? Cost of asset? Factor declining percent? Cross over to straight-line depreciation for year #5. Press < ENTER> to continue, M for Menu	8 100 1000 150
Life of asset? Salvage value? Cost of asset? Factor declining percent? Cross over to straight-line depreciation for year #6. Press <enter> to continue, M for Menu</enter>	9 500 25000 200

```
Ref
                              Line Numbers
+----+
:02900: 2975
:10000: 2975
      : 2925
                2930
        Depreciation factor
: I
      : 2940
                2945
        Calculation variable
      : 2910
: L
               2935
        Asset lifespan
: N
      : 2940
               2945
        Periods in future value
: P
      : 2940
                2945
                       2950
        Principal calculation
:SL
      : 2955
              2960
        Straight-line expense
: T
     : 2945
        Loop counter
: X
      : 2935
                2965
                       2970
       Lifespan loop counter
: X O
      : 2910
             2930
                       2955
        Lifespan of asset
: X1
      : 2915
                2955
        Salvage value
: X2
      : 2950
               2960
        Miscellaneous variable
: X4
      : 2930
               2940
                       2950
        Miscellaneous variable
: X6
      : 2920
              2940
       Asset cost
: X9
     : 2950
               2955
        Stores value of P
      : 2935
                2940
                     2955
        Current life value, less one
```

Straight-line versus Declining-Balance Depreciation Program

```
2900 CLS:PRINT" Straight Line or Declin
ing Balance?": REM B4
2905 PRINTTAB(10) "When to cross over."
2910 INPUT"Life of asset";L:X0=L
2915 INPUT"Salvage value"; X1
2920 INPUT"Cost of asset"; X6
2925 INPUT"Factor declining percent";F
2930 X4=-1*((F/X0)/100)
2935 FOR X=1 TO L:Y=X-1
2940 N=Y:P=X6:I=X4
2945 FOR T=1TON:P=P+(P*(I)):NEXT T
2950 X2 = -1*(P*X4):X9 = P
2955 SL=(X9-X1)/(X0-Y)
2960 IF X2-SL>O THEN NEXT
2965 IF X>XO THEN PRINT"Do not cross ove
r to straight line de- preciation. "
2970 PRINT"Cross over to straight line d
epreciationfor year #";X;"."
 2975 GOSUB10000: RUN2900
 10000 PRINT@281, "Press <ENTER> to contin
 ue, M for MENU";
 10005 A$=INKEY$:IFA$="M"ORA$="m"THENMAXF
 ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
 10005ELSERETURN
```

AMORTIZATION

Amortization is the process of spreading the cost of an item or collection of items over a period of time, with part of each period's cost being a payment on the principal amount and part being interest on the principal. This program generates a schedule of all the payments of an amortized loan.

With this program, you have a choice of having the payment schedule listed to the display, memory, or a printer. For printing in RAM, you'll need to supply a filename for the data file.

Examples

Pro	ogram			Your $response$
Pri	nt schedule to:			
	Screen			
2—	Lineprinter			
3-	File			
?				3
$\mathrm{Fil}\epsilon$	ename?			Test
	ginal debt?			45000
	erest rate %?			8
Nur	mber of paymer	its per year?		4
Tota	al number of pa	yments?		16
Am	ortization Sche	dule		10
	Working			
	Press <ente< td=""><td>R> to continue,</td><td>M for Menu</td><td></td></ente<>	R> to continue,	M for Menu	
#!	PAYMENT!	INTEREST!	PRINC.!	BALANCE
1!	3314.26!	900.00!	2414.26!	42585.74
2!	3314.26!	851.71!	2462.55!	40123.19
3!	3314.26!	802.46!	2511.80!	37611.39
4!	3314.26!	752.23!	2562.03!	35049.36
5!	3314.26!	700.99!	2613.27!	32436.09
6!	3314.26!	648.72!	2665.54!	29770.55
7!	3314.26!	595.41!	2718.85!	27051.70
8!	3314.26!	541.03!	2773.23!	24278.47
9!	3314.26!	485.57!	2828.69!	21449.78
10!	3314.26!	429.00!	2885.26!	18564.52
11!	3314.26!	371.29!	2942.97!	15621.55

12!	3314.26!	312.43!	3001.83!	12619.72
13!	3314.26!	252.39!	3061.87!	9557.85
14!	3314.26!	191.16!	3123.10!	6434.75
15!	3314.26!	128.70!	3185.56!	3249.19
16!	3314.26!	64.98!	3249.28!	-0.09

Above is an example of how the file TEST.DO looks.

Pri	nt schedule to:			
	Screen			
	Lineprinter			
	File			
?				1
Ori	ginal debt?			50000
	erest rate %?			15
Number of payments per year?			12	
Total number of payments?			$\frac{-2}{24}$	
	ortization Sche			
	Working			
		R> to continue,	M for Menu	
#!		INTEREST!	PRINC.!	BALANCE
1!	2424.33!	625.00!	1799.33!	48200.67
2!	2424.33!	602.51!		46378.85
3!	2424.33!	579.74!		44534.26
4!	2424.33!	556.68!	1867.65!	42666.61
	Press <ente< td=""><td>R> to continue,</td><td></td><td></td></ente<>	R> to continue,		
#!	PAYMENT!	INTEREST!	PRINC.!	BALANCE
5!	2424.33!	533.33!	1891.00!	40775.61
6!	2424.33!	509.70!	1914.63!	38860.98
7!	2424.33!	485.76!	1938.57!	36922.41
8!	2424.33!	461.53!	1962.80!	34959.61
9!	2424.33!	437.00!	1987.33!	32972.28
	Press < ENTE	R> to continue,	M for Menu	
#!	PAYMENT!	INTEREST!	PRINC.!	BALANCE
10!	2424.33!	412.15!	2012.18!	30960.10
11!	2424.33!	387.00!	2037.33!	28922.77
12!	2424.33!	361.53!	2062.80!	26859.97
13!	2424.33!	335.75!	2088.58!	24771.39
14!	2424.33!	309.64!	2114.69!	22656.70
	Press < ENTE	R> to continue,	M for Menu	

#!	PAYMENT!	INTEREST!	PRINC.!	BALANCE
15!	2424.33!	283.21!	2141.12!	20515.58
16!	2424.33!	256.44!	2167.89!	18347.69
17!	2424.33!	229.35!	2194.98!	16152.71
18!	2424.33!	201.91!	2222.42!	13930.29
19!	2424.33!	174.13!	2250.20!	11680.09
	Press < ENTE	R> to continue,	M for Menu	
	1 1 000 \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		212 202 21201	
#!	PAYMENT!	INTEREST!	PRINC.!	BALANCE
$\frac{\#!}{20!}$,		BALANCE 9401.76
	PAYMENT!	INTEREST!	PRINC.!	
20!	PAYMENT! 2424.33!	INTEREST! 146.00!	PRINC.! 2278.33!	9401.76
20! 21!	PAYMENT! 2424.33! 2424.33!	INTEREST! 146.00! 117.52!	PRINC.! 2278.33! 2306.81!	9401.76 7094.95
20! 21! 22!	PAYMENT! 2424.33! 2424.33! 2424.33!	INTEREST! 146.00! 117.52! 88.69!	PRINC.! 2278.33! 2306.81! 2335.64!	9401.76 7094.95 4759.31

```
Line Numbers
  Ref
:04600: 4750
:04615: 4640
:04640: 4630
                        4635
                4625
:04645: 4620
:04750: 4755
:04755: 4715
                4745
:04765: 4700
                4760
:10000: 4750
                4675
: C
       : 4665
         Payments per year
                                4725
                4705
       : 4645
:C0
         Calculation variable
                                        4730
                                4725
                        4720
                4705
       : 4650
: D
         Original date
                 4755
       : 4745
:EN
         End of job marker
                                4740
                         4730
                 4715
       : 4710
: I
         Payment number
                         4730
                 4725
: I1
       : 4720
         Calculation variable
                                        4765
                                 4730
                 4690
       : 4685
:LS
         Print character
                                 4765
                 4690
                         4695
       : 4685
: MS
         Print character
                         4710
       : 4670
                 4705
: N
         number of payments
                                 4630
                                         4685
                 4620
                         4625
       : 4615
: NF
                                 4755
                                         4765
                 4695
                         4700
         4690
         output to (device)
                 4725
       : 4705
 : P
         Calculation variable
                 4730
       : 4605
 :PU$
         PRINTUSING format field
                         4675
                 4660
       : 4655
 :R
          Interest rate
                 4705
                         4720
       : 4675
 :R1
          Rate per payment
```

Amortization Program

```
4600 MAXFILES=1:CLEAR 900:REM AMORT
 4605 PU$="##\\####.##\\####.##\
 \#####.##":" \ is <GRPH> - (minus)
4610 CLS:PRINTTAB(7) *Amortization Schedu
4615 PRINT"Print schedule to: ":PRINT" 1-
Screen":PRINT" 2-Lineprinter":PRINT" 3-F
ile":INPUTNF:CLS
4620 IFNF=1THENOPEN"LCD: "FOROUTPUTAS1:GO
T04645
4625 IFNF=2THENOPEN"LPT: "FOROUTPUTAS1:GO
T04645
4630 IFNF<>3THEN4640ELSEINPUT"Filename";
FN$: IFLEN(FN$)>6THENFN$=LEFT$(FN$,6)
4635 FN$=FN$+".DO":OPENFN$FOROUTPUTAS1:G
OT 04645
4640 GOTO4615
4645 CO=.5
4650 INPUT "Original debt amount"; D
4655 INPUT "Interest rate %";R
4660 R=R/100
4665 INPUT"Number of payments per year";
4670 INPUT"Total number of payments"; N
4675 R1=R/C
4680 CLS
4685 IFNF=10RNF=3THENL$=CHR$(245):M$=CHR
$(241)
4690 IFNF=2THENL$="!":M$="-"
4695 IFNF=20RNF=3THEN:PRINT"Amortization
 Schedule": PRINT@136, "Working": PRINT#1, "
# ";L$;" PAYMENT"L$;"INTEREST";L$;" PRIN
C. ";L$;" BALANCE":PRINT#1,STRING$(39,M$
4700 IFNF=1THENGOSUB4765
4705 P = INT(CO + D*(R1/(1-(1+R1)^{(-N)))*100
)/100
4710 FOR I=1 TO N
4715 IFINT(I/5)=I/5THENGOSUB4755
4720 I1=INT(CO+D*R1*100)/100
4725 D=INT(CO+(D-(P-I1))*100)/100
4730 PRINT#1, USINGPU$; I, L$, P, L$, I1, L$, P-
I1.L$.D
4735 PRINT#1."":
```

4740 NEXT I 4745 EN=1:GOSUB4755 4750 GOSUB10000:RUN4600 4755 IFNF=2THENRETURNELSEIFNF=3THENCLOSE :OPENFN\$FORAPPENDAS1:RETURNELSE IFEN=1TH EN4750 4760 GOSUB10000 4765 CLS:PRINT#1, "# "; L\$; " PAYMENT"L\$; "I NTEREST"; L\$; " PRINC. "; L\$; " BALANCE": PRI NTSTRING\$ (39, M\$): IF NF = 2THENRETURNEL SEPRI NT@42, CHR\$ (250); : PRINT@51, CHR\$ (250); : PRI NT@60, CHR\$ (250); : PRINT@69, CHR\$ (250) : RETU RN 10000 PRINT@281, "Press <ENTER> to contin ue. M for Menu"; 10005 A\$=INKEY\$:IFA\$="M"ORA\$="m"THENMAXF ILES=0: CLEARO: MENUELSEIFA\$ <> CHR\$ (13) THEN 10005ELSERETURN

AVERAGE YIELD OF AN INVESTMENT

When dealing with stock investments, you are usually presented with figures attesting as to yield rate. Since there are many ways to figure the yield rates of stocks, it is easy to become confused as to which stocks are the best investments. To reduce the confusion and simplify the comparisons, it's best to convert the figures to the average annual rate of return, expressed as a percentage.

This program takes the original stock price (the price you paid for it), the current (or projected) stock price, the amount of the dividends paid by the stocks, if any, and the number of periods the stock is held (or invested). From these the program calculates the interest rate, per period, that you earned on the stock (your return on investment).

The program ignores the effect any sales fees or commissions might have on the yield rate.

Examples

Program	Your $response$
Enter original stock price? Enter current stock price? Enter amount of dividends? Number of periods invested? Interest rate is 5.700% per period. Press <enter> to continue, M for Menu</enter>	100 120 12 5
Enter original stock price? Enter current stock price? Enter amount of dividends? Number of periods invested? Interest rate is 16.610% per period. Press <enter> to continue, M for Menu</enter>	25 32 2 2

Accountant's Helpers 165

Enter original stock price?	25
Enter current stock price?	30
Enter amount of dividends?	ENTER
Number of periods invested?	3
Interest rate is 6.260% per period.	
Press < ENTER > to continue M for Me	nii

```
Line Numbers
  Ref
:03150: 3230
:03185: 3205
:03210: 3200
:03230: 3220
:03235: 3195
:10000: 3230
:10005: 10005
                3175
                        3200
: CP
      : 3160
        Current stock price
:DV
      : 3165
                3175
        Dividends
      : 3175
                                3220
: I
                3185
                        3210
                                      3225
        3240
        Trial interest rate
      : 3175
                3185
                        3210
                                3215
:IC
        Trial rate increment
      : 3215
:IP
        Miscellaneous variable
: OP
      : 3155
                3190
        Original price
                        3240
      : 3190
                3200
        Trial principal
:PE
      : 3170
                3235
        Periods invested
: T
      : 3180
                3210
        Decimal places in answer
      : 3235
                3245
: X
        Loop counter
```

Average Yield of an Investment Program

```
3150 CLS:PRINT"
                   AVERAGE YIELD OF AN I
NVESTMENT": REM D1
3155 INPUT"Enter original stock price";0
3160 INPUT"Enter current stock price"; CP
3165 INPUT"Enter amount of dividends pai
d":DV
3170 INPUT"Number of periods invested";P
3175 I=0:IC=1:CP=CP+DV
3180 FOR T = 1TO3
3185 I = I + IC
3190 P#=0P
3195 GOSUB 3235
3200 IFP#>=CP THEN 3210
3205 GOTO 3185
3210 I=I-IC:IC=IC/10:NEXT T
3215 IC=IC*10:IP=IP+IC
3220 IF I<O THEN PRINT"DATA ERROR. PLEAS
E CHECK YOUR VALUES. ": GOTO3230
3225 PRINTUSING"Interest rate is #.##.#
##% per period.":I
3230 GOSUB10000:RUN3150
3235 FOR X=1 TO PE
3240 P#=P#+P#*(I/100)
3245 NEXT X:RETURN
10000 PRINT@281, "Press <ENTER> to contin
ue. M for MENU";
10005 A$=INKEY$:IFA$="M"ORA$="m"THENMAXF
ILES=0: CLEARO: MENUELSEIFA$<> CHR$(13) THEN
10005ELSERETURN
```

WEIGHTED AVERAGE NUMBER OF STOCK SHARES OUTSTANDING

In order for you to compute your business's earnings per share, you must first calculate the total number of shares outstanding. If the total changed during the year, then a weighted average calculation, by days outstanding, needs to be made. This program makes the calculation, ignoring dividends and splits.

First, enter the date for the first day of the period to be considered, in MM/DD/YY format, where MM is the month, DD is the day, and YY is the last two digits of the year. Next, enter the number of shares owned as of that date.

Now enter any dates on which you either purchased or sold stock, followed by the number of shares manipulated. If you purchased stocks, use a positive number; if you sold your stock, use a negative number (precede the number with a minus sign).

Keep doing this until you've entered all the stock transactions. If you haven't any stock transactions or you've already typed them all in, just press <ENTER> in answer to the transaction date prompt. Now type in the last day of the period under consideration.

From this information the program will figure the weighted average number of shares outstanding during the specified period. Your total earnings may then be divided by this number to compute earnings per share.

Note that this program uses a subroutine. This program block, named Days between Dates and printed in chapter one, calculates the number of days between two dates. For more information, see that program's listing.

	Your
Program	response
Enter date for first day of period	
(MM/DD/YY)?	01/01/80
Number of shares outstanding at first	
period?	1000
Transaction date (press ENTER if done)	
(MM/DD/YY)?	06/30/80

Enter number of shares purchased?	10000
Transaction date (press ENTER if done) (MM/DD/YY)? Enter number of shares purchased?	07/11/80 2000
Transaction date (press ENTER if done) (MM/DD/YY)? Enter number of shares purchased?	12/02/80 -1000
Transaction date (press ENTER if done) (MM/DD/YY)? Enter number of shares purchased?	01/10/81 100
Transaction date (press ENTER if done) (MM/DD/YY)?	ENTER
Enter last day of period (MM/DD/YY)?	01/30/81
The weighted average number of shares outstanding during the year is: 7,732.49 Press <enter> to continue, M for Menu</enter>	
Enter date for first day of period	
(MM/DD/YY)?	05/01/81
Number of shares outstanding at first period?	12345
Transaction date (press ENTER if done) (MM/DD/YY)? Enter number of shares purchased?	12/12/81 2645
Transaction date (press ENTER if done) (MM/DD/YY)? Enter number of shares purchased?	02/02/81 -5000
Transaction date (press ENTER if done) (MM/DD/YY)?	ENTER
Enter last day of period (MM/DD/YY)? The weighted average number of shares	03/31/82
outstanding during the year is: 12,354.90	
Press <enter> to continue, M for Menu</enter>	

Ref	Line Numbe	0 20 0
++		=1.2
:03000:		
:03025:	0000	
:03030:		
:03125:		
:03145:	9115	
:09115:		
:09160: :09175:		
:09190:		
	9190	
:10000:	3145	
:D\$:	30 40 3030 30	60
•	3075 3080 3085 3090 31	00
•	3110 Date entered	
:D1 :	2100	0.0
:	Day of each transaction	90
:DB :		80
	9190	
. D.D.	Days between dates	
:DD :	3050 3055 3115 9115 91 9130 9155 9190	25
	Day of first transaction	
:DD\$:		
:	Month and day	
:E :	0200	
: :M(:	First entry pointer	
:M(:	3020 3025 9125 9145 918 Days in each month	30
:M1 :	3090 3095 3115 9115 91	2 0
•	9175	20
•	Month of each transaction	
: MM :	3040 3045 3115 9115 912	20
•	9125 9130 9140 9145 919	55
•	9175 9180 9185 Month of first transaction	
:Р :		
•	Shares purchased	
: S :	3070 3120	

```
Shares outstanding
                        3140
                3135
      : 3130
:WA
        Weighted average
                                9150
                        9145
      : 3025
                9140
: X
        Loop counter
                        3135
                3130
        3115
: X O
        days outstanding
                        3125
      : 3065
                3070
: X1
         shares outstanding
                3130
                        3135
      : 3125
:X2
         shares outstanding
      : 3115
                3125
: X5
         days between dates
      : 3120
                3125
: X6
         Total shares outstanding
       : 3125
: X7
         Miscellaneous variable
                                9120
                                        9135
                        9115
                 3115
:Y1
       : 3110
         9160
         Years of transactions
                                        9125
                                9120
                         9115
                 3115
       : 3060
:YY
                                        9160
                         9145
                                9155
                 9135
         9130
                         9180
                 9170
         9165
         Year of first transaction
```

Weighted Average Number of Stock Shares Outstanding Program

```
3000 CLS:PRINTTAB(6)"WEIGHTED AVG. NUMBE
 R OF SHARES": REM C1
 3005 ' FOR COMPUTATION OF EARNINGS PER S
 HARE
 3010 ' BASED ON ACTUAL DAYS HELD
 3015 ' STOCK SPLITS AND DIVIDENDS ARE IG
 NORED
3020 DIM M(12):DATA 31,28,31,30,31,30,31
 ,31,30,31,30,31
3025 FOR X=1 TO 12:READM(X):NEXT X
3030 PRINT"Enter date for first day of p
eriod":INPUT"(MM/DD/YY)";D$
3035 IF LEN(D$)<>8 THEN 3030
3040 MM=VAL(LEFT$(D$,2))
3045 IFMM<10RMM>12THEN3025
3050 DD$=LEFT$(D$,5):DD=VAL(RIGHT$(DD$,2
))
3055 IFDD<10RDD>31THEN3025
3060 YY=VAL(RIGHT$(D$,2)):IFYY<0THEN3025
3065 INPUT"Number of shares outstanding
at first
            period":X1
3070 S = X1
3075 D$="":INPUT"Transaction date (press
 ENTER if done) (MM/DD/YY)";D$
3080 IF D$="" THEN PRINT"Enter last day
of period":INPUT"(MM/DD/YY)";D$:E=1
3085 IF LEN(D$) <> 8 THEN 3030
3090 M1=VAL(LEFT$(D$,2))
3095 IFM1<10RM1>12THEN3075
3100 DD$=LEFT$(D$,5):D1=VAL(RIGHT$(DD$,2
3105 IFD1<10RD1>31THEN3075
3110 Y1=VAL(RIGHT$(D$,2)):IFY1<OTHEN3075
3115 GOSUB9115: X5=DB: X0=X0+DB: MM=M1: YY=Y
1:DD=D1
3120 IF E=1 THEN 3125 ELSE INPUT"Enter n
umber of shares purchased";P:S=S+P:X6=S
3125 \times 7 = \times 1 \times \times 5 : \times 2 = \times 2 + \times 7 : \times 1 = \times 6
3130 IF E=0 THEN3075:WA=X2/X0
3135 WA = X2/X0
```

```
3140 PRINT"The weighted average number o
f shares
           outstanding during the year i
s:":PRINTUSING"#,##########;WA
3145 GOSUB10000:RUN3000
9100 ' DAY BETWEEN DATES
                                    DBD
9105 ' ****** SUBROUTINE ******
9110 ' M1/D1/Y1 - MM/DD/YY
9115 IF YY>Y1 OR (YY=Y1 AND MM>M1) OR (Y
Y=Y1 AND MM=M1 AND DD>D1) THEN PRINT"Dat
a entry error":GOTO3145
9120 IF Y1=YY AND M1=MM THEN 9190
9125 DB=M(MM)-(DD-1):IF INT(YY/4)=YY/4 A
ND MM=2 THEN DB=DB+1
9130 DD=1:MM=MM+1:IFMM=13 THEN MM=1:YY=Y
Y+1:GOT09160
9135 IF Y1=YY THEN 9175
9140 FOR X=MM TO 12
9145 DB=DB+M(X):IF INT(YY/4)=YY/4 AND MM
=2 THEN DB=DB+1
9150 NEXT X
9155 MM=1:DD=1:YY=YY+1
9160 IF Y1=YY THEN 9175
9165 DB=DB+365:IF INT(YY/4)=YY/4 THEN DB
= DB + 1
9170 YY=YY+1:GOTO9160
9175 IFM1=MM THEN 9190
9180 DB=DB+M(MM): IF INT(YY/4)=YY/4 AND M
M=2 THEN DB=DB+1
9185 MM=MM+1:GOTO9175
9190 IF DD=D1 THEN 9195 ELSE DB=DB+(D1-D
D)
9195 RETURN
10000 PRINT@281, "Press <ENTER> to contin
ue. M for MENU";
10005 A$=INKEY$:IFA$="M"ORA$="m"THENMAXF
ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
10005ELSERETURN
```

	•		
a			
7			
9.			

4

Time Is Money

It took Albert Einstein years of work and study to develop his theory of the time-space relationship. Jack the Shark realized, after only a few moments in the loan business, that time *is* money. ("If ya wanna borrow my money, ya hafta *pay* fer it . . . daily!")

Money is used as capital to make more money. That earned additional money has many names: interest, profit, opportunity cost, return on investment, internal rate of return, overage, cost of capital, IRS bait, and more. With every transaction made, some provision for the time value of money must be made. These programs allow you to make that provision and calculate the time value of money in every situation.

Each program title in this chapter includes a formula of the sort A,B,C, = X, where A, B, and C represent values you must supply, and X represents what the program tells you after its calculations. A, B, and C are input, in other words, and X is output. The actual variables used are: FV (future value), PV (present value), PMT (payment), N (number of payments), and I (interest rate). These formulas will let you quickly and accurately find the program that matches your requirements.

Simple questions like How much money will I make if I deposit \$100 a month for ten years? are answered by the simple and compound interest programs. More complex questions dealing with business decisions are addressed by some of the other programs. For example, if your company has a policy of making a 45 percent profit per year on its money and wants to lease a

machine for \$100 a month, what does that machine have to produce by the end of its life to be a worthwhile investment? To calculate this, you would use the annuity program that calculates future value. The formula you would look for in this case would be PMT,N,I = FV, where the PMT (payment) is \$100, I (interest rate) is 45 percent, and N (number of periods) is the life in years of the machine. The interest rate would be assumed to be compounding yearly because the company expects its 45 percent profit on an annual basis.

Choose the programs you would like to use, and enter them in the computer. If you like, you may enter them together with the menu program suggested earlier. Keep in mind that there is no need to enter any text preceded by REM or 'unless you would like to modify the programs later.

SIMPLE INTEREST— **FUTURE VALUE** (PV,I,N=FV)

Nothing is free, so when you borrow money from others, they charge you for the privilege. Interest is the fee you pay for the use of someone else's money.

There are many different methods of calculating this interest. Some involve simple calculations; others, complex calculations. Almost always, the interest paid is based on four factors:

- 1. The amount of money borrowed (called the principal).
- 2. The interest rate or fee for using the borrowed money (usually expressed as a percentage of the principal per specific time unit).
- 3. The length of time the money is to be borrowed, with the most common units being months or years.
- 4. The method used to calculate the fee or interest.

The last factor is the most important in many cases, since the same numbers used for the first three factors can yield markedly different results in the amount of money that has to be returned to the person it was borrowed from, depending on the method used to calculate the interest.

The first and most obvious method of calculating interest is that used in figuring what is called simple interest. You just take the amount borrowed, multiply it by the interest rate (a percentage), and multiply that number by the total number of periods of time the money is borrowed. Thus, borrowing \$1,000 for two years at 10 percent interest per year would require that \$1,200 be returned to the lender.

The time periods for interest calculations are very important. If you are borrowing money and the interest period is one year, then this means that the interest calculation is performed only once a year. Borrowing the money for ten years would mean that the principal is multiplied by the interest rate ten times. On the other hand, if the interest rate is calculated on a monthly basis, then each and every month the principal is multiplied by the interest rate.

The first program in this series is a program for calculating simple interest. The program asks for the principal amount (money to be borrowed), the length of the interest period (*year*, *month*, or *day*—type in one of these three), the interest rate used for each period, and the total number of periods the money is to be borrowed. With this information, the program calculates the total money to be repaid the lender.

Program	Your $response$
Principal (dollars)? Interest period (year, month, day)?	1000 Year
Interest rate (% per year)?	6
Number of years?	2
Total after 2 years is \$1120.00	
Press <enter> to continue, M for Menu</enter>	
Principal (dollars)?	1000
Interest period (year, month, day)?	Year
Interest rate (% per year)?	12
Number of years?	3
Total after 3 years is \$1360.00	
Press <enter> to continue, M for Menu</enter>	

```
Ref
                Line Numbers
+----+
:00200: 240
:10000: 240
: I
   : 215
             230
      Interest rate per time period
: P
   : 205 230
                   235
       Principal
            215 220
:P$ : 210
                       225
                                235
      Interest period
: T
    : 225 230
                   235
      Number of periods
```

Simple Interest— Future Value (PV,I,N = FV) Program

```
200 CLS:PRINTTAB(13)"SIMPLE INTEREST":RE
M A1
205 PRINT: INPUT "Principal (dollars)"; P
210 INPUT"Interest period (Year, Month,
215 PRINT"Interest rate (% per ";P$;")";
:INPUT I
220 P$=P$+"s"
225 PRINT"Number of ";P$;:INPUT T
230 P=P+(T*(P*(I/100)))
235 PRINT"Total after";T;P$;" is ";:PRIN
TUSING"$$#,######.##";P
240 GOSUB10000:RUN200
10000 PRINT@281."Press <ENTER> to contin
ue, M for MENU";
10005 A $ = I N K E Y $ : I F A $ = "M" O R A $ = "m" T H E N M A X F
ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
10005ELSERETURN
```

COMPOUND INTEREST— **FUTURE VALUE** (PV,I,N=FV)

This program calculates compound interest. Compound interest calculations are performed on the balance of the money, not on just the principal amount. If you're borrowing money, the interest is calculated on the outstanding balance at the end of each interest calculation period.

If you're saving money, the interest earned in one period is added to the principal, so that the next interest calculation is on the new balance. Each period, your money is compounded and adds up

to more than the previous month's balance.

You tell this program the principal amount, the interest period, the interest rate, the number of times the interest is compounded per interest period, and the number of interest periods the principal is to be compounded. With these, the program calculates how the balance builds each period. The program displays each period calculated, rather than just displaying the final balance after all the interest periods, so you can see how the money compounds.

Program	Your $response$
1 Togram	гевропос
Principal?	1000
Interest period (year, month, day)?	Year
Interest rate (% per year)?	12
Number of times compounded/year?	1
Number of years?	3
Total after 1 period is \$1,120.00	
Total after 2 periods is \$1,254.40	
Total after 3 periods is \$1,404.93	
Press <enter> to continue, M for Menu</enter>	

$\underline{182 \quad 60 \; Business \; Applications \; Programs \, / \; TRS-80 \; Model \; 100}$

Principal?	1000
Interest period (year, month, day)?	Month
Interest rate (% per month)?	1.5
Number of times compounded/month?	1
Number of months?	3
Total after 1 period is \$1,015.00	
Total after 2 periods is \$1,030.23	
Total after 3 periods is \$1,045.68	
Press <enter> to continue, M for Menu</enter>	

```
Ref
                  Line Numbers
:00250: 325
:10000: 315
               325
     : 270
               275
                       290
        Times compounded per period
                      295
: I
      : 265
               275
        Interest rate per time period
               295
                       310
      : 255
: P
        Principal
                                      285
                              280
: P$
     : 260
               265
                       270
        Interest period
: T
      : 285
               290
        Number of periods
                              315
                300
                       305
: X
      : 290
        Period counter
```

Compound Interest— Future Value (PV,I,N = FV) Program

```
250 CLS:PRINTTAB(10)"COMPOUND INTEREST":
REM A2
255 PRINT: INPUT "Principal"; P
260 INPUT"Interest Period (Year, Month,
Day)"; P$
265 PRINT"Interest rate (% per ";P$;")";
:INPUT I
270 PRINT"Number of times compounded/":P
$::INPUTC
275 I=I/C
280 P$=P$+"s"
285 PRINT"Number of ":P$;:INPUT T
290 FOR X=1TOT*C
295 P=P+P*(I/100)
300 PRINTUSING"Total after### period";X;
305 IFX>1THENPRINT"s";
310 PRINTUSING" is$$#,########;P
315 IF X/7=INT(X/7)THEN GOSUB10000:CLS
320 NEXT
325 GOSUB10000:RUN250
10000 PRINT@281, "Press <ENTER> to contin
ue, M for MENU";
10005 A$=INKEY$:IFA$="M"ORA$="m"THENMAXF
ILES=0: CLEARO: MENUELSEIFA$<> CHR$ (13) THEN
10005ELSERETURN
```

OTHER COMPOUND INTEREST COMPUTATIONS

The next three programs are interrelated. The first one tells you how long it will take for your investment to reach a predetermined level. The second tells you what your initial investment would have to be to reach a given level from a certain initial investment. The last tells you what the interest rate would have to be to give you the desired return from the initial investment over a set period of time. The three can, of course, be used together or separately.

COMPOUND INTEREST— TIME PERIOD (PV,I,FV = N)

Every once in a while, you need to know how long it will take for your money, invested at a certain interest rate, to build up to a certain level. This type of computation comes in handy when you're planning for future expenditures and want to know just how long it will take before you can spend your money on the item you want. Or, for example, to put it more dramatically, how long will it take to double your money?

This program takes the original investment amount, the interest rate per interest period, the number of compounding periods in the interest period, and the target amount of money and then calculates how many interest periods it will take to reach the target amount.

In most cases, the interest period is months or years.

Program	Your $response$
Initial investment amount?	1000
Interest rate %?	12
Per (year, month, day)?	Year
Number of times compounded per year?	12
Desired return?	2000
If you invest \$1000.00	
at a rate of 12% per year,	
compounded 12 times per year,	
you will have \$2006.76 after 70	
compounding periods, or 5.83 years.	
Press <enter> to continue, M for Menu</enter>	

Initial investment amount?	200
Interest rate %?	1
Per (year, month, day)?	Week
Number of times compounded per week?	1
Desired return?	2000
If you invest \$200.00	
at a rate of 1% per week,	
compounded 1 times per week,	
you will have \$2011.82 after 232	
compounding periods, or 232 weeks.	
Press <enter> to continue, M for Menu</enter>	

```
Ref
                    Line Numbers
:00450: 540
:00490: 500
:00505: 490
:10000: 540
:B$
      : 455
                505
                        525
         PRINTUSING format field
: C
      : 475
                485
                        515
                                535
        Times compounded per period
:FV
      : 480
                490
        Desired future value
: I
      : 465
                485
                        510
        Interest rate
: I $
      : 470
                475
                        510
                                515
                                        520
        535
        Interest Period
      : 485
                490
                                525
        Increasing principal
:PI
      : 485
                495
       Interest rate/compounding period
:PV
      : 460
                485
                        505
        Present value
: X
      : 495
                525
                        535
        Number of times compounded
```

Compound Interest— Time Period (PV,I,FV=N) Program

```
450 CLS:PRINT"HOW LONG WILL IT TAKE? TIM
E COMPUTATION": REM A3
455 PRINT:B$="$$#,######## - ##"
460 INPUT"Initial investment amount"; PV
465 INPUT"Interest rate %"; I
470 INPUT"Per (Year, Month, Day)"; I$
475 PRINT"Number of times compounded per
 ": I$:: INPUTC
480 INPUT"Desired return"; FV
485 PI=I/C:PI=PI/100:P=PV
490 IF P>=FV THEN 505
495 P=P+(P*PI):X=X+1
500 GOTO 490
505 CLS:PRINT:PRINT"If you invest";USING
B$:PV
510 PRINTTAB(5) "at a rate of"; I; "% per "
 ; 1 $ : " . "
515 PRINT"Compounded";C;"times per ";I$;
520 I$=I$+"s"
525 PRINT"You will have"; USINGB$; P; : PRIN
T" after":X
530 PRINT"compounding periods, or";
535 PRINTUSING"###.##"; X/C;: PRINT" "; I$;
. .
540 GOSUB10000: RUN450
10000 PRINT@281, "Press <ENTER> to contin
ue, M for MENU":
10005 A $ = I NKEY $ : I F A $ = "M" OR A $ = "m" THE NMAXF
ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
 10005ELSERETURN
```

COMPOUND INTEREST— PRESENT VALUE (FV,I,N = PV)

This program is similar to the previous program, Compound Interest—Time Period, in that it makes a time computation, only this time you give the program the future value desired, the interest rate, the interest period, the number of compounding periods per interest period, and the total number of compounding periods to be considered. From this information, the program calculates the initial investment amount that you'll need to reach your goal. For instance, how much will you have in ten years?

n	Your
Program	response
Interest rate %?	12
Per (year, month, day)?	Year
Number of times compounded per year?	12
Amount to be paid in the future?	1000
After how many compounding periods will	
it be paid?	120
At an interest rate of 12% per year,	
compounded 12 times per year,	
the present value of \$1000	
to be paid 120 periods hence is:	
\$302.99	
Press <enter> to continue, M for Menu</enter>	

Interest rate %?	15
Per (year, month, day)?	Year
Number of times compounded per year?	12
Amount to be paid in the future?	1611
After how many compounding periods will	
it be paid?	48
At an interest rate of 15% per year,	
compounded 12 times per year,	
the present value of \$1611	
to be paid 48 periods hence is:	
\$887.43	
Press <enter> to continue, M for Menu</enter>	

```
Ref
                    Line Numbers
:00550: 635
:10000: 635
:B$
      : 555
                620
                        630
         PRINTUSING format field
: C
      : 570
                585
                        615
        Times compounded per period
:FV
      : 575
                590
                        620
        Future value
: I
      : 560
                585
                        610
         Interest rate per period
: I $
      : 565
                570
                        610
                                615
        Interest Period
: N
      : 580
                595
                        625
        Number of compounding periods
: P
      : 590
                600
                        630
        Increasing principal
:PI
      : 585
                600
        Interest rate/compounding period
: X
      : 595
        Number of compounding periods
```

Compound Interest— Present Value (FV,I,N = PV) Program

```
550 CLS:PRINTTAB(13) "PRESENT VALUE": REM
A 4
555 B$="$$#,##########"
560 PRINT:INPUT"Interest rate %";I
565 INPUT"Per (Year, Month, Day)"; I$
570 PRINT"Number of times compounded per
 ": I$::INPUTC
575 INPUT"Amount to be paid in the futur
e":FV
580 INPUT"After how many compounding per
iods will it be paid":N
585 PI=I/C:PI=PI/100: PI=INTEREST RATE
PER COMPOUND PERIOD
590 P=FV
595 FOR X=1 TO N
600 P = P/(PI + 1)
605 NEXT X:CLS:PRINT
610 PRINT"At an interest rate of"; I; "% p
er "; [$; ", "
              compounded ";C; "times per "
615 PRINT"
; [$; ", "
             the present value of";USING
620 PRINT"
B$:FV
             to be paid";N;"periods henc
625 PRINT"
e is:"
630 PRINTUSINGB$;P
635 GOSUB10000:RUN550
10000 PRINT@281, "Press <ENTER> to contin
ue. M for MENU";
10005 A $ = I NKE Y $ : I F A $ = "M" OR A $ = " m" THE NMA X F
ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
10005ELSERETURN
```

COMPOUND INTEREST— INTEREST RATE (PV,FV,N = I)

This program takes the initial investment amount and the number of years it's invested and determines what the interest rate would have to be to give the desired future value. For investors this would answer such questions as What rate should I shoot for? and What are they paying me?

Program	Your $response$
Enter present value? Enter future value? Enter years invested? Interest rate is 25.89% Press < ENTER > to continue, M for Menu	100 1000 10
Enter present value? Enter future value? Enter years invested? Interest rate is 8.44% Press < ENTER > to continue, M for Menu	1000 1500 5

```
Ref
                   Line Numbers
+----+
:00650: 725
:00680: 700
:00705: 695
:00725: 715
:00730: 690
:10000: 725
      : 660
                695
        Future Value
: I
      : 670
                680
                       705
                            715
                                       720
        735
        Interest rate per period
:IC
      : 670
                680
                       705
                               710
        Miscellaneous Variable
:IP
        Interest rate/compounding period
: N
      : 665
                730
        Years to calculate
:P#
      : 685
              695
                       735
        Miscellaneous variable
:PV
      : 655
                685
        Present value
                705
: T
      : 675
        Loop counter
: X
      : 730
               740
        Loop counter
```

Compound Interest— Interest Rate (PV,FV,N = I) Program

```
650 CLS:PRINTTAB(10)"INTEREST RATE":REM
655 INPUT"Enter present value";PV
660 INPUT"Enter future value"; FV
665 INPUT"Enter years invested"; N
670 I=0:IC=1
675 FOR T=1T03
680 I = I + IC
685 P#=PV
690 GOSUB 730
695 IFP#>=FV THEN 705
700 GOTO 680
705 I = I - IC : IC = IC / 10 : NEXT T
710 IC=IC*10:IP=IP+IC
715 IF I<O THEN PRINT"DATA ERROR. PLEASE
 CHECK YOUR VALUES": GOTO725
720 PRINT"Interest rate is:":I:"%"
725 GOSUB10000: RUN650
730 FOR X=1 TO N
735 P#=P#+P#*(I/100)
740 NEXT X
745 RETURN
10000 PRINT@281, "Press <ENTER> to contin
ue. M for MENU":
10005 AS=INKEYS:IFAS="M"ORAS="m"THENMAXF
ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
10005ELSERETURN
```

EQUIVALENT INTEREST— COMPARING COMPOUND PERIODS (IR(c) = IR(c))

This program takes the interest rate charged for one interest period and determines what the effective interest rate is after a given number of compounding periods. In other words, if you give it the monthly interest rate (the nominal rate), the program will tell you the annual or semiannual (or any other multiple of the interest period) interest rate (the effective rate of interest for that period of time). The program answers questions such as: If you borrow money at a rate of 5 percent per quarter, compounded monthly, what's the yearly (twelve-period) rate?

To use the program, just give it the interest rate, interest period, number of compounding periods per interest period, and total number of compounding periods for which you want the interest rate calculated. The program takes these figures and calculates the effective interest rate for the number of compounding periods you specified.

	Your
Program	response
Interest rate %?	1.5
Per (year, month, day)?	Month
Compounded how many times per month?	1
Figure effective rate for how many com-	12
pounding periods?	14
Nominal rate is 1.5% per month, compounded 1 times per month.	
Interest rate per compounding period is 1.5%.	
Effective rate after 12 periods is	
19.56%. Press <enter> to continue, M for Menu</enter>	

$\underline{198 \quad 60 \text{ Business Applications Programs / TRS-80 Model } 100}$

Interest rate %?	12
Per (year, month, day)?	Year
Compounded how many times per year?	1
Figure effective rate for how many com-	
pounding periods?	12
Nominal rate is 12% per year,	
compounded 1 times per year.	
Interest rate per compounding	
period is 12.00%.	
Effective rate after 12 periods is	
289.60%	
Press < ENTER > to continue M for Monu	

```
Line Numbers
 Ref
+----+
:00350: 440
:10000: 440
               380
                      415
    : 370
        Times compounded per period
                     410
: I
      : 360
               380
        Interest rate per time period
                      410
                            415
            370
: I $
        Interest period
               395
                      430
      : 385
: N
        Number of compounding periods
               395
                     405
      : 390
        Effective interest rate
            395
                     425
:PI
      : 380
        Interest rate/compounding period
             425
                      435
: U$
      : 355
        PRINTUSING format field
            400
     : 395
: X
        Loop counter
```

Equivalent Interest— Comparing Compound Periods (IR(c) = IR(c)) Program

```
350 CLS:PRINTTAB(6)"EQUIVALENT INTEREST
RATES": REM A6
355 U$="###.##"
360 PRINT: INPUT "Interest rate %":I
365 INPUT"Per (Year, Month, Day)"; I$
370 PRINT"Compounded how many times per
":I$;:INPUTC
375 REM FIGURE INTEREST RATES PER COMPOU
NDING PERIOD
380 PI=I/C:PI=PI/100
385 INPUT"Figure effective rate for how
many com- pounding periods": N
390 P=1
395 FOR X=1 TO N:P=P+(P*PI)
400 NEXT X
405 P=P-1:P=P*100
410 CLS:PRINT"Nominal rate is"; I; "% per
": 1$
415 PRINTTAB(5)"compounded";C;"times per
 ":I$
420 PRINT"Interest rate per compounding"
425 PI=PI*100:PRINTTAB(5)"period is"USIN
GU$:PI::PRINT"%"
430 PRINT"Effective rate after"; N; "perio
ds is:"
435 PRINTTAB(5)USINGU$;P;:PRINT"%"
440 GOSUB10000:RUN350
10000 PRINT@281, "Press <ENTER> to contin
ue, M for MENU";
10005 A$=INKEY$:IFA$="M"ORA$="m"THENMAXF
ILES=0: CLEARO: MENUELSEIFA$<> CHR$(13) THEN
10005ELSERETURN
```

ANNUITIES, ORDINARY AND DUE

The next sixteen programs calculate various annuities. An annuity is a series of equal payments made at regular periods of time, usually weeks or months. Annuities are divided into two classes: ordinary annuities and annuities due.

Ordinary annuities have payments that are made at the end of each payment period. Loans are usually based on this type of annuity. Annuities due have payments that are made at the beginning of each payment period, in anticipation of some type of service or as in an investment program. Leases and savings programs usually fall into this category.

The first four programs calculate present and future values, both ordinary and with continuous compounding.

ORDINARY ANNUITY— FUTURE VALUE (PMT,N,I = FV)

Let's suppose you're making regular deposits into a savings account; how much money will you have after a number of deposits?

This program takes the amount of the payments, their total number, the number per year, the annual interest rate, and the compounding period and calculates the future value.

Program	Your response
Enter amount of payments?	177.70
Total number of payments?	12
Number of payments per year?	12
Enter annual interest rate %?	12
Compounded how many times a year?	12
Future value of this ordinary annuity is \$2,253.68 Press <enter> to continue, M for Menu</enter>	
Enter amount of payments?	63.81
Total number of payments?	18
Number of payments per year?	12
Enter annual interest rate %?	18
Compounded how many times a year?	12
Future value of this ordinary annuity is \$1,307.43 Press < ENTER > to continue M for Manu	

```
Line Numbers
 Ref
:01400:
       1465
:01465: 1435
:09000: 1440
:10000: 1465
                        9000
                               9005
                1435
      : 1430
: C
        Compounding periods per year
                9015
:CP
      : 9005
        Compounding periods/payment
      : 9000
                9015
:IC
        Interest rate/compounding period
                9020
:IP
      : 1450
        Interest rate per payment
                9000
      : 1425
:IR
        Annual interest rate
                        9005
      : 1420
                1435
: N2
         Number of payments per year
                1445
: N3
      : 1415
        Total number of payments
                1460
       : 1450
: P#
         Miscellaneous variable
                1450
       : 1410
:PQ
         Trial payment amount
       : 9015
                9020
: Q V
         Effective interest rate
                        9015
                1450
       : 1445
: X
         Loop counter
```

Ordinary Annuity— Future Value (PMT,N,I = FV) Program

```
1400 CLS:PRINT" FUTURE VALUE OF AN ORDIN
ARY ANNUITY": REM A7
1410 INPUT"Enter amount of payments";PQ
1415 INPUT"Total number of payments"; N3
1420 INPUT"Number of payments per year";
N 2
1425 INPUT"Enter annual interest %"; IR
1430 INPUT"Compounded how many times a y
ear";C
1435 IF N2>C THENPRINT YOU MAY NOT MAKE
MORE THAN ONE DEPOSIT PER INTEREST COMPO
UNDING PERIOD. PLEASE RE-ENTER": GOTO1465
1440 GOSUB9000: 'FIND EFFECTIVE INTEREST
 RATE PER PAYMENT
1445 FOR X=1 TO N3
1450 P#=PQ+(P#+(P#*((IP)/100))):NEXTX
1455 PRINT"FUTURE VALUE OF THIS ORDINARY
 ANNUITY IS":
1460 PRINTUSING"$$#, #######. ##"; P#
1465 GOSUB10000: RUN1400
9000 IC=(IR/C)/100: 'INTEREST RATE PER CO
MPOUNDING PERIOD
9005 CP=C/N2: 'COMPOUNDS PER PAYMENT
9010 'FIND EFFECTIVE INTEREST RATE FOR C
2 PERIODS
9015 QV=1:FOR X=1 TO CP:QV=QV+(QV*IC):NE
9020 IP=(QV-1)*100: 'IP=INTEREST PER PAYM
ENT
9025 RETURN
10000 PRINT@281, "Press <ENTER> to contin
ue. M for MENU":
10005 A$=INKEY$:IFA$="M"ORA$="m"THENMAXF
ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
10005ELSERETURN
```

ORDINARY ANNUITY— **FUTURE VALUE** WITH CONTINUOUS COMPOUNDING OF INTEREST, PV KNOWN (PV,N,I=FV)

Some savings and loan associations and banks are now charging or paying interest using a technique known as the continuous compounding of interest. Continuous compounding means the compounding of interest throughout each interest period, rather than just at the end of each period.

This means the institution earns, or pays, slightly more than with the other method.

This program takes the annual compounding rate, the number of years to term, and the present value of the payments and calculates the future value of the balance.

Program	Your $response$
Enter annual compounding rate? Enter number of years? Enter present value of payments? Future value is \$2,006.66 Press <enter> to continue, M for Menu</enter>	18 2 1400
Enter annual compounding rate? Enter number of years? Enter present value of payments? Future value is \$1,822.12 Press <enter> to continue, M for Menu</enter>	12 5 1000

```
Ref
                            Line Numbers
:02150: 2190
:10000: 2190
    : 2180
               2185
        Future value
: I
      : 2160
               2175
        Annual interest rate
              2175
     : 2165
       Number of years
      : 2175
               2180
       FV Calculation variable
      : 2170
               2180
        Present value
```

Ordinary Annuity—
Future Value with
Continuous Compounding
of Interest, PV Known
(PV,N,I = FV) Program

2150 CLS:PRINT" CONTINUOUS COMPOUNDING INTEREST RATE": REM A8 2155 PRINTTAB(12) "FUTURE VALUE" 2160 PRINT:INPUT"Enter annual compoundin q rate":I 2165 INPUT"Enter number of years"; N 2170 INPUT"Enter present value of paymen ts":PV 2175 P = ((I/100)*N)2180 FV = EXP(P) *PV2185 PRINTUSING"Future value is \$\$#,#### ##.##";FV 2190 GOSUB10000:RUN2150 10000 PRINT@281, "Press <ENTER> to contin ue, M for MENU"; 10005 A \$ = I NKEY\$: IF A \$ = "M"ORA \$ = "m"THE NMAXF ILES=0: CLEARO: MENUELSEIFA\$<> CHR\$ (13) THEN 10005ELSERETURN

ORDINARY ANNUITY— FUTURE VALUE WITH CONTINUOUS COMPOUNDING OF INTEREST, PMT KNOWN (PMT,N,I = FV)

The previous program used the compounding rate, number of periods, and present value to find the future value. This program uses compounding rate, number of periods, and payment to find the future value of the annuity.

Program	Your response
Enter periodic compounding rate?	18
Enter number of periods?	3
Amount of payment per period? Future value is \$47,733.79 Press <enter> to continue, M for Menu</enter>	12000
Enter periodic compounding rate?	12
Enter number of periods?	6
Amount of payment per period?	6000
Future value is \$52,721.66	
Press <enter> to continue, M for Menu</enter>	

```
Line Numbers
 Ref
+----+
:02250: 2290
:10000: 2290
      : 2275
               2280
: A
        Payment per period
                2285
      : 2280
:FV
        Future value
                       2280
                2265
     : 2260
: I
        Periodic interest rate
                2280
      : 2270
: N
        Number of periods
     : 2280
: P
        FV calculation variable
```

Ordinary Annuity— Future Value with Continuous Compounding of Interest, PMT Known (PMT,N,I = FV) Program

2250 CLS:PRINT" CONTINUOUS COMPOUNDING A NNUITIES RATE": REM A9 2255 PRINTTAB(12)"FUTURE VALUE" 2260 PRINT: INPUT "Enter periodic compound ing rate"; I 2265 I=I/100 2270 INPUT"Enter number of periods"; N 2275 INPUT"Amount of payment per period" 2280 P=I*N:P=EXP(P):FV=A*((P-1)/I)2285 PRINTUSING"Future value is \$\$#,#### ##.##";FV 2290 GOSUB10000:RUN2250 10000 PRINT@281, "Press <ENTER> to contin ue, M for MENU"; 10005 A\$=INKEY\$:IFA\$="M"ORA\$="m"THENMAXF ILES=0:CLEARO:MENUELSEIFA\$<>CHR\$(13)THEN 10005ELSERETURN

ORDINARY ANNUITY— PRESENT VALUE (PMT,N,I = PV)

Given the amount and number of payments in the annuity, the number per year, the annual interest rate, and the compounding period, this program will find the present value of the annuity.

Suppose your company is receiving monthly payments of \$177.70 for one year at 12 percent interest, compounded monthly. What is the present value of the annuity?

Program	Your $response$
Enter amount of payments? Total number of payments? Number of payments per year? Enter annual interest rate %? Compounded how many times a year? The present value is \$2,000.03 Press <enter> to continue, M for Menu</enter>	177.70 12 12 12 12 12
Enter amount of payments? Total number of payments? Number of payments per year? Enter annual interest rate %? Compounded how many times a year? The present value is \$1,000.07 Press <enter> to continue, M for Menu</enter>	63.81 18 12 18 12

```
Ref
                               Line Numbers
+----+
:01500: 1565
:01565: 1535
:09000: 1540
:10000: 1565
: C
      : 1530
                1535
                        9000
                                9005
         Compounding periods per year
: CP
       : 9005
                9015
        Compounding periods/payment
:IC
      : 9000
                9015
        Interest rate/compounding period
:IP
      : 1550
                9020
        Interest rate per payment
:IR
      : 1525
                9000
        Annual interest rate
: N2
      : 1520
                1535
                        9005
        Number of payments per year
: N3
      : 1515
                1545
        Total number of payments
: P#
      : 1550
                1560
        Miscellaneous Variable
:PQ
      : 1510
                1550
        Trial payment
: Q V
      : 9015
                9020
        Effective interest rate
: X
      : 1545
                1555
                        9015
        Loop counter
```

Ordinary Annuity— Present Value (PMT,N,I=PV) Program

```
1500 CLS:PRINT"PRESENT VALUE OF AN ORDIN
ARY ANNUITY": REM A10
1510 INPUT"Enter amount of payments"; PQ
1515 INPUT"Total number of payments"; N3
1520 INPUT"Number of payments per year":
N 2
1525 INPUT"Enter annual interest rate"; I
1530 INPUT"Compounded how many times a y
ear"; C
1535 IF N2>C THENPRINT"YOU MAY NOT MAKE
MORE THAN ONE DEPOSIT PER INTEREST COMP
OUNDING PERIOD. PLEASE RE-ENTER": GOTO156
1540 GOSUB9000: 'FIND EFFECTIVE INTEREST
 RATE PER PAYMENT
1545 FOR X=N3 TO 1 STEP -1
1550 P#=(PQ+P#)/(1+(IP/100)): 'MOVE BACK
ONE PMT
1555 NEXT X
1560 PRINTUSING"The present value is: $$
# . ####### . ##" : P#
1565 GOSUB10000:RUN1500
9000 IC=(IR/C)/100: 'INTEREST RATE PER CO
MPOUNDING PERIOD
9005 CP=C/N2: COMPOUNDS PER PAYMENT
9010 'FIND EFFECTIVE INTEREST RATE FOR C
2 PERIODS
9015 QV=1:FOR X=1 TO CP:QV=QV+(QV*IC):NE
9020 IP=(0V-1)*100: 'IP=INTEREST PER PAYM
ENT
9025 RETURN
10000 PRINT@281. "Press <ENTER> to contin
ue, M for MENU";
10005 A$=INKEY$:IFA$="M"ORA$="m"THENMAXF
ILES=0: CLEARO: MENUELSEIFA$<> CHR$ (13) THEN
10005ELSERETURN
```

ORDINARY ANNUITY— PRESENT VALUE WITH CONTINUOUS COMPOUNDING OF INTEREST, PMT KNOWN (PMT,N,I = PV)

This program solves for the present value of an annuity using the periodic compounding rate, the number of periods, and the payment per period.

Program	Your $response$
Enter periodic compounding rate? Enter number of periods? Amount of payment per period? Present value is \$11,405.51 Press <enter> to continue, M for Menu</enter>	18 4 4000
Enter periodic compounding rate? Enter number of periods? Amount of payment per period? Present value is \$32,077.98 Press <enter> to continue, M for Menu</enter>	12 6 7500

```
Line Numbers
 Ref
+---+
:02200: 2245
:10000: 2245
     : 2225
              2230
: A
        Payment per period
                      2230
     : 2210
               2215
: I
        Periodic interest rate
               2230
     : 2220
: N
        Number of periods
     : 2230
               2235
        PV Calculation variable
:PV : 2235 2240
        Present value
```

Ordinary Annuity—
Present Value
with Continuous
Compounding of
Interest, PMT Known
(PMT,N,I = PV) Program

```
2200 CLS:PRINT"
                 CONTINUOUS COMPOUNDING
 ANNUITIES": REM All
2205 PRINTTAB(12) "PRESENT VALUE"
2210 INPUT"Enter periodic compounding ra
te":I
2215 I = I/100
2220 INPUT"Enter number of periods"; N
2225 INPUT"Amount of payment per period"
2230 P=-1*(I*N):P=EXP(P):P=A*((1-P)/I)
2235 PV = P
2240 PRINTUSING"Present value is $$#,###
###.##":PV
2245 GOSUB10000:RUN2200
10000 PRINT@281, "Press <ENTER> to contin
ue, M for MENU";
10005 A$=INKEY$:IFA$="M"ORA$="m"THENMAXF
ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
10005ELSERETURN
```

ORDINARY ANNUITY— PRESENT VALUE WITH CONTINUOUS COMPOUNDING OF INTEREST, FV KNOWN (FV,N,I = PV)

This program computes the present value of the payments from the annual compounding rate, the number of years the balance is on deposit, and the future value of the payments.

Program	Your $response$
Enter annual compounding rate? Enter number of years? Enter future value of payments? Present value is \$1,395.35 Press <enter> to continue, M for Menu</enter>	18 2 2000
Enter annual compounding rate? Enter number of years? Enter future value of payments? Present value is \$1,573.26 Press <enter> to continue, M for Menu</enter>	12 2 2000

```
Ref
                              Line Numbers
+----+
:02100: 2140
:10000: 2140
:FV
      : 2120
                2130
        Future value
: I
      : 2110 2125
        Annual interest rate
      : 2115
                2125
        Number of years 2125 2130
      : 2125
        Calculation variable
      : 2130 2135
        Present value
```

Ordinary Annuity—
Present Value
with Continuous
Compounding of Interest,
FV Known
(FV,N,I = PV) Program

2100 CLS:PRINT" CONTINUOUS COMPOUNDING INTEREST RATE": REM A12 2105 PRINTTAB(12) "PRESENT VALUE" 2110 PRINT: INPUT "Enter annual compoundin q rate":I 2115 INPUT"Enter number of years"; N 2120 INPUT"Enter future value of payment s";FV 2125 P = ((I/100)*N*-1)2130 PV=EXP(P)*FV 2135 PRINTUSING"Present value is \$\$#,### ###.##":PV 2140 GOSUB10000:RUN2100 10000 PRINT@281, "Press <ENTER> to contin ue, M for MENU"; 10005 A\$=INKEY\$:IFA\$="M"ORA\$="m"THENMAXF ILES=0:CLEARO:MENUELSEIFA\$<>CHR\$(13)THEN 10005ELSERETURN

ORDINARY ANNUITY— PAYMENT, PV KNOWN (PV,N,I = PMT)

If you are purchasing equipment for a business, one of your requirements is to know the cost-to-earnings ratio: how much money the equipment costs per period versus how much money it earns for the company in the same period. If the ratio is too low, the equipment shouldn't be purchased. For example, if you purchase the equipment for \$1,000, and you're using 18 percent per year as your cost of capital, what revenues does the machine need to earn for you to justify its purchase?

This program will determine the cost of the equipment, or the loan payment, when given the starting or present value, the total number of payments, the number of payments per year, the annual interest rate, and the number of compounding periods per

year.

Program	Your $response$
Enter annuity present value? Total number of payments? Number of payments per year? Enter annual interest rate %? Compounded how many times a year? Payments would be \$63.81 Press <enter> to continue, M for Menu</enter>	1000 18 12 18 12
Enter annuity present value? Total number of payments? Number of payments per year? Enter annual interest rate %? Compounded how many times a year? Payments would be \$177.70 Press <enter> to continue, M for Menu</enter>	2000 12 12 12 12 12

```
Line Numbers
 Ref
:01250: 1340
                1325
:01300: 1320
:01335: 1315
:01340: 1330
:09000: 1290
:10000: 1340
                        9005
      : 1280
                9000
: C
        Compounding periods per year
                9015
:CP
      : 9005
        Compounding periods/payment
                9015
:IC
      : 9000
        Interest rate/compounding period
      : 1305
                9020
:IP
         Interest rate per payment
                9000
:IR
         Annual interest rate
                9005
      : 1270
: N2
         Number of payments per year
                1295
                        1300
       : 1265
: N3
         Total number of payments
                        1320
: P#
       : 1305
                1315
         Payment calculation variable
                                      1325
                               1320
                        1315
                1295
:PP
       : 1260
         Present value
                               1325
                                      1335
                 1305
                        1320
       : 1295
: P0
         Trial payments
                        1325
       : 1285
                 1320
: QQ
         Trial increment
                 9020
       : 9015
:01
         Effective interest rate
                        9015
       : 1300
                 1310
: X
         Loop counter
```

Ordinary Annuity— Payment, PV Known (PV,N,I = PMT) Program

```
1250 CLS:PRINT" PAYMENT FOR AN ORDINARY
 ANNUITY": REM A13
1255 ' I.E. FIND LOAN PAYMENTS BEGINNING
 1 PERIOD AFTER LOAN
1260 INPUT"Enter annuity present value";
PP
1265 INPUT"Total number of payments"; N3
1270 INPUT"Number of payments per year";
N 2
1275 INPUT"Enter annual interest rate %"
:IR
1280 INPUT"Compounded how many times a y
ear":C
1285 QQ=.1
1290 GOSUB9000: 'FIND EFFECTIVE INTEREST
 RATE PER PAYMENT
1295 PQ=PP/N3
1300 FOR X=N3TO 1 STEP -1
1305 P#=(PQ+P#)/(1+(IP/100)): 'MOVE BACK
ONE PMT
1310 NEXT X
1315 IFINT(P#*100)=PP*100 THEN 1335
1320 IF P# < PP THEN PQ = PQ + (PQ * QQ) : P# = 0 : GO
T01300
1325 IF P\#>PP THEN QQ=QQ*.1:PQ=PQ-(PQ*(Q
0*10)):P#=0:GOTO 1300
1330 GOTO1340
1335 PRINT"Payments would be";USING"$$#.
###### . ##"; PQ
1340 GOSUB10000:RUN1250
9000 IC=(IR/C)/100: 'INTEREST RATE PER CO
MPOUNDING PERIOD
9005 CP=C/N2: 'COMPOUNDS PER PAYMENT
9010 'FIND EFFECTIVE INTEREST RATE FOR C
2 PERIODS
9015 QV=1:FOR X=1 TO CP:QV=QV+(QV*IC):NE
XΤ
9020 IP=(QV-1)*100: 'IP=INTEREST PER PAYM
ENT
9025 RETURN
```

10000 PRINT@281, "Press <ENTER> to contin ue, M for MENU"; 10005 A\$=INKEY\$:IFA\$="M"ORA\$="m"THENMAXF ILES=0:CLEARO:MENUELSEIFA\$<>CHR\$(13)THEN 10005ELSERETURN

ORDINARY ANNUITY— PAYMENT, FV KNOWN (FV,N,I = PMT)

If you know the future value, compounding period, annual interest rate, payment period, and total number of payments, you can use this program to tell you the payment amount. You may also use the program to calculate the necessary deposits for a sinking fund.

Program Enter future value of annuity? Total number of payments? Number of payments per year? Enter annual interest rate %? Compounded how many times a year? Payments would be \$371.19	Your response 10000 15 12 7.4 12
Press <enter> to continue, M for Menu Enter future value of annuity? Total number of payments? Number of payments per year? Enter annual interest rate %? Compounded how many times a year? Payments would be \$21.96 Press <enter> to continue, M for Menu</enter></enter>	1500 48 12 17.16 12

```
Line Numbers
 Ref
+----+
01700: 1790
                1775
:01750: 1770
:01785: 1765
:09000: 1740
:10000: 1790
                9000
                       9005
      : 1730
: C
        Compounding periods per year
                9015
      : 9005
: CP
        Compounding periods/payment
                       1770
                               1775
      : 1710
                1745
:FV
        Future value
                9015
:IC
      : 9000
         Interest rate/compounding period
                9020
      : 1755
:IP
         Interest rate per payement
                9000
       : 1725
:IR
         Annual interest rate
                9005
       : 1720
: N2
         Number of payments per year
                       1750
       : 1715
                1745
: N3
         Total number of payments
                        1770
                1765
       : 1755
: P#
         Miscellaneous variable
       : 1765
:PP
         Estimated payment
                                1775
                                       1785
                        1770
                1755
       : 1745
: P0
         Trial payment
                1770
                        1775
       : 1735
: QQ
         Trial increment
       : 9015
                9020
: QV
         Effective interest rate
                 1760
                        9015
       : 1750
         Loop counter
```

Ordinary Annuity— Payment, FV Known (FV,N,I = PMT) Program

```
1700 CLS:PRINT"
                      PAYMENT FOR AN ORDIN
 ARY ANNUITY": REM A14
 1710 INPUT"Enter future value of annuity
 ":FV
 1715 INPUT"Total number of payments"; N3
1720 INPUT"Number of payments per year";
N 2
1725 INPUT"Enter annual interest rate %"
1730 INPUT"Compounded how many times a y
ear";C
1735 00 = .1
1740 GOSUB9000: 'FIND EFFECTIVE INTEREST
 RATE PER PAYMENT
1745 PQ=FV/N3
1750 FOR X=1 TO N3
1755 P#=PQ+(P#+(P#*((IP)/100)))
1760 NEXT X
1765 IFINT(P#*100)=FV*100 THEN 1785
1770 IF P#<FV THEN PQ=PQ+(PQ*QQ):P#=0:G0
T01750
1775 IF P#>FV THEN QQ=QQ*.1:PQ=PQ-(PQ*(Q
0*10)):P#=0:GOTO 1750
1785 PRINT"Payments would be ";:PRINTUSI
NG"$$#,######.##":PO
1790 GOSUB10000: RUN1700
9000 IC=(IR/C)/100: 'INTEREST RATE PER CO
MPOUNDING PERIOD
9005 CP=C/N2: COMPOUNDS PER PAYMENT
9010 'FIND EFFECTIVE INTEREST RATE FOR C
2 PERIODS
9015 QV=1:FOR X=1 TO CP:QV=QV+(QV*IC):NE
9020 IP=(QV-1)*100: 'IP=INTEREST PER PAYM
ENT
9025 RETURN
10000 PRINT@281, "Press <ENTER> to contin
ue. M for MENU";
10005 A $ = I NKE Y $: IF A $ = "M"ORA $ = "M"THE NMAXF
ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
10005ELSERETURN
```

ORDINARY ANNUITY— INTEREST RATE, FV KNOWN (PMT,N,FV = I)

If you know the number, period, and amount of the payments and the future value of your annuity, what is the interest rate? Or suppose you are depositing \$100 a month for twelve months, with a goal of having \$1,300 by the end of the annuity. What interest rate do you need?

	Your
Program	response
Enter amount of payments?	100
Total number of payments?	12
Number of payments per year?	12
Enter the future value of the annuity?	1300
Interest rate is 1.43% per period, 17.16% per year, compounded 12 times a year. Press <enter> to continue, M for Menu</enter>	
Enter amount of payments?	50
Total number of payments?	18
Number of payments per year? Enter the future value of the	12
annuity?	1300
Interest rate is 4.14% per period,	
49.68% per year, compounded 12 times a year.	
Press <enter> to continue, M for Menu</enter>	

```
Ref
                              Line Numbers
+----+
:01600: 1675
:01640: 1650
:01655: 1640
:01675: 1665
:01680: 1635
                1650
:10000: 1675
:FV
      : 1625
                1640
        Future value
:IC
      : 1630
                1645
                       1655
                               1660
        Interest rate/compounding period
:IP
      : 1630
                1645
                       1655
                               1660
        1670
                1685
        Interest rate per period
: N2
      : 1620
               1670
        Number of payments per year
: N3
      : 1615
                1680
        Total number of payments
: P#
      : 1630
               1640
                      1650
        Miscellaneous variable
:PQ
      : 1610
               1685
        Trial payment amount
: T
      : 1630
              1655
        Loop counter
: X
      : 1680
               1690
        Loop counter
```

Ordinary Annuity— Interest Kate, FV Known (PMT,N,FV=I) Program

```
1600 CLS:PRINT" INTEREST RATE OF AN ORDI
NARY ANNUITY": REM A15
1605 ' FUTURE VALUE GIVEN
1610 INPUT"Enter amount of payments";PQ
1615 INPUT"Total number of payments"; N3
1620 INPUT"Number of payments per year";
N 2
1625 PRINT"Enter the future value of the
":INPUT" annuity":FV
1630 IP=0:IC=1:FORT=1 TO 3:P#=1
1635 GOSUB1680
1640 IFP#>FV THEN 1655
1645 IP = IP + IC
1650 P#=1:GOSUB 1680:GOTO 1640
1655 IP=IP-IC:IC=IC/10:NEXT T
1660 IC=IC*10:IP=IP+IC
1665 IF IP<0 THEN PRINT"DATA ERROR. PLEA
SE CHECK YOUR VALUES": GOTO1675
1670 CLS:PRINT"Interest rate is":IP:"% p
er period,":PRINTUSING"###.##";IP*N2;:PR
INT"% ";:PRINT"per year, compounded";N2;
"times a year."
1675 GOSUB10000:RUN1600
1680 FOR X=1 TO N3
1685 P \#= PQ + (P \#+ (P \#* ((IP)/100)))
1690 NEXT X
1695 RETURN
10000 PRINT@281. "Press <ENTER> to contin
ue. M for MENU":
10005 A $ = I N K E Y $ : I F A $ = "M" OR A $ = " m" THE N M A X F
ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
10005ELSERETURN
```

ORDINARY ANNUITY— INTEREST RATE, PV KNOWN (PMT,N,PV = I)

As an investor, you're probably frequently approached by people wanting your financial support. One of the variables to consider is the rate of return on your money.

This program takes the total number of payments, number of payments per year, amount of the payments, and present value (investment amount) of the payments and calculates the interest rate of your return on your investment.

	Your
Program	response
Enter amount of payments?	75
Total number of payments?	16
Number of payments per year?	12
Enter present value of the annuity?	1000
Interest rate is 1.52% per period,	
18.24% per year, compounded 12 times a	
year.	
Press <enter> to continue, M for Menu</enter>	
Enter amount of payments?	100
Total number of payments?	24
Number of payments per year?	12
Enter present value of the annuity?	2000
Interest rate is 2.24% per period,	
26.88% per year, compounded 12 times a	
year.	
Press <enter> to continue, M for Menu</enter>	

```
Line Numbers
 Ref
:02000: 2075
:02040: 2050
:02055: 2040
:02075: 2065
                2050
:02080: 2035
:10000: 2075
                                2060
                        2055
                2045
      : 2030
: IC
         Interest rate/compounding period
                                        2065
                                2060
                2045
                        2055
      : 2030
:IP
                2085
         2070
         Interest rate per period
                2070
       : 2020
: N2
         Number payments per year
                 2080
       : 2015
: N3
         Total number of payments
                        2050
                 2040
       : 2030
: P#
         Miscellaneous variable
       : 2010
                 2085
: PQ
         Payment amount
                 2040
       : 2025
:PV
         Present value
       : 2030
                 2055
: T
         Loop counter
                 2090
       : 2080
: X
         Loop counter
```

Ordinary Annuity— Interest Rate, PV Known (PMT,N,PV = I) Program

```
2000 CLS:PRINT" INTEREST RATE OF AN ORD
 INARY ANNUITY": REM A16
 2005 PRINTTAB(9)"PRESENT VALUE GIVEN"
2010 INPUT"Enter amount of payments"; PQ
2015 INPUT"Total number of payments"; N3
2020 INPUT"Number of payments per year";
N 2
2025 INPUT"Enter the present value of th
e annuity";PV
2030 IP=0:IC=1:FORT=1 TO 3:P#=1
2035 GOSUB2080
2040 IFP#<PV THEN 2055
2045 IP=IP+IC
2050 P#=1:GOSUB 2080:GOTO 2040
2055 IP=IP-IC:IC=IC/10:NEXT T
2060 IC=IC*10:IP=IP+IC
2065 IF IP<0 THEN PRINT"DATA ERROR. PLEA
SE CHECK YOUR VALUES":GOTO2075
2070 CLS:PRINT"Interest rate is:":PRINTU
SING"###.##% per period.
                             ###.##% per
year, compounded ### times a year."; IP; IP
*N2:N2
2075 GOSUB10000:RUN2000
2080 FOR X=N3TO 1 STEP -1
2085 P#=(PQ+P#)/(1+(IP/100)):REM MOVE BA
CK ONE PMT
2090 NEXT X
2095 RETURN
10000 PRINT@281, "Press <ENTER> to contin
ue, M for MENU":
10005 A $ = I NKEY$: IFA $ = "M"ORA $ = "M"THENMAXF
ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
10005ELSERETURN
```

ORDINARY ANNUITY— NUMBER OF PAYMENTS (PV,PMT,I=N)

Many times, when borrowing money, you know what you want the monthly payment to be, how much you're going to be borrowing, the interest rate, the payment period, and the compounding period, but you need to find the number of payments and the amount of the final payment. For example, if you were going to buy a \$1,000 piece of equipment and you could afford to pay only \$75 per month, how long would it take to pay it off? This program will provide that information. Payments are assumed to fall at the end of each month.

Program	Your response
Enter present value of annuity? Enter amount of payments? Number of payments per year? Enter annual interest rate %? Compounded how many times a year? You will make 15 payments. The last payment will be \$28.70. Press <enter> to continue, M for Menu</enter>	1000 75 12 12 12
Enter present value of annuity? Enter amount of payments? Number of payments per year? Enter annual interest rate %? Compounded how many times a year? You will make 23 payments. The last payment will be \$42.70. Press <enter> to continue, M for Menu</enter>	2000 100 12 12 12

```
Ref
                               Line Numbers
:01900: 1995
:01950: 1955
:01995: 1935
:09000: 1940
:10000: 1995
: C
       : 1930
                 1935
                        9000
                                9005
         Compounding periods per year
:CP
       : 9005
                 9015
         Compounding periods/payment
:IC
       : 9000
                9015
         Interest rate/compounding period
: IP
       : 1950
                1965
                        1985
                                9020
         Interest rate per payment
:IR
       : 1925
                9000
         Annual interest rate
: N2
       : 1920
                1935
                        9005
         Payments periods per year
: P#
       : 1950
                1955
                        1960
                                1965
                                        1970
         Payment calculator
:PQ
      : 1915
                1950
                        1965
        Payment amount
:PV
      : 1910
                1955
                        1970
                                1985
                                        1990
        Present value
:0 V
      : 9015
                9020
        Effective interest rate
: X
      : 1945
                1955
                        1960
                                1975
                                        1980
        1990
                9015
        Number of payments
      : 1960
                1970
                        1980
                                1985
        Loop counter
```

Ordinary Annuity— Number of Payments (PV,PMT,I = N) Program

```
1900 CLS:PRINT" NUMBER OF PAYMENTS, AND
 LAST PAYMENT": REM A17
1905 ' I.E. PAYMENTS MADE AT THE END OF
EACH MONTH
1910 INPUT"Enter present value of the an
nuity";PV
1915 INPUT"Enter amount of payments";PQ
1920 INPUT"Number of payments per year";
N 2
1925 INPUT"Enter annual interest rate %"
:IR
1930 INPUT"Compounded how many times a y
ear";C
1935 IF N2>C THENPRINT"YOU MAY NOT MAKE
MORE THAN ONE DEPOSIT PER INTEREST COMP
OUNDING PERIOD. PLEASE RE-ENTER":GOTO199
1940 GOSUB9000: 'FIND EFFECTIVE INTEREST
RATE PER PAYMENT
1945 X = 0
1950 P#=(PQ+P#)/(1+(IP/100)): 'MOVE BACK
ONE PMT
1955 IF P#<PV THEN X=X+1:GOTO 1950
1960 P#=0:FOR Z=X TO 1 STEP -1
1965 P#=(PQ+P#)/(1+(IP/100)): 'MOVE BACK
ONE PMT
1970 NEXTZ:PV=PV-P#
1975 X=X+1: 'ADD LAST PMT
1980 FOR Z=1 TO X
1985 PV=PV+(PV*(IP/100)):NEXTZ
1990 PRINTUSING"you will make #, ### paym
ents.
      The last payment will be $$#,####
###.##":X:PV
1995 GOSUB10000:RUN1900
9000 IC=(IR/C)/100: 'INTEREST RATE PER CO
MPOUNDING PERIOD
9005 CP=C/N2: 'COMPOUNDS PER PAYMENT
9010 'FIND EFFECTIVE INTEREST RATE FOR C
2 PERIODS
```

9015 QV=1:FOR X=1 TO CP:QV=QV+(QV*IC):NE XT
9020 IP=(QV-1)*100:'IP=INTEREST PER PAYM ENT
9025 RETURN
10000 PRINT@281,"Press <ENTER> to continue, M for MENU";
10005 A\$=INKEY\$:IFA\$="M"ORA\$="m"THENMAXFILES=0:CLEARO:MENUELSEIFA\$<>CHR\$(13)THEN 10005ELSERETURN

ANNUITY DUE— FUTURE VALUE (I,PMT,N=FV)

The most frequent use for this type of program is in determining the future value of regular deposits, made at the beginning of each month, in a savings account. Thus, not only does the bank balance grow by compounding interest each month, it also is increased by the deposit.

To use the program, just give it the dollar amount of the payments, the total number of payments, the number of payments per year, the annual interest rate, and the number of compounding periods in one year. From these the program will calculate and display the growth of the balance, as well as a final total. The balances displayed are the balances as of that deposit; thus, the first deposit represents the opening balance of the account. The final deposit is the total at the end of the month of the last deposit (which was made at the beginning of the month).

If your computation requires that multiple deposits be made in each compounding period, enter the total payment made per compound period. Of course, payments made midperiod will not start earning interest until the start of the next compound period.

T)	Your	
Program	response	?
Enter amount of payments?	100	
Total number of payments?	12	
Number of payments per year?	12	
Enter annual interest rate %?	12	
Compounded how many times per year?	12	
Payment 1 total on deposit \$100.00		
Payment 2 total on deposit \$201.00		
Payment 3 total on deposit \$303.01		
Payment 4 total on deposit \$406.04		
Payment 5 total on deposit \$510.10		
Payment 6 total on deposit \$615.20		
Payment 7 total on deposit \$721.35		
Press <enter> to continue, M for Menu</enter>		

Payment 8 total on deposit \$828.57 Payment 9 total on deposit \$936.85 Payment 10 total on deposit \$1046.22 Payment 11 total on deposit \$1156.68 Payment 12 total on deposit \$1268.25 Final total \$1280.93 Press <enter> to continue, M for Menu</enter>	
Enter amount of payments?	50
Total number of payments?	12
Number of payments per year?	12
Enter annual interest rate?	18
Compounded how many times per year?	12
Payment 1 total on deposit \$50.00	
Payment 2 total on deposit \$100.75	
Payment 3 total on deposit \$152.26	
Payment 4 total on deposit \$204.55	
Payment 5 total on deposit \$257.61	
Payment 6 total on deposit \$311.48	
Payment 7 total on deposit \$366.15	
Press <enter> to continue, M for Menu</enter>	
Payment 8 total on deposit \$421.64	
Payment 9 total on deposit \$477.97	
Payment 10 total on deposit \$535.14	
Payment 11 total on deposit \$593.16	
Payment 12 total on deposit \$652.06	
Final total \$661.84	
Press <enter> to continue, M for Menu</enter>	

```
Ref
                               Line Numbers
+----+
:00750: 830
:09000: 790
:10000: 785
                810
                        830
: C
      : 780
                785
                        9000
                                9005
         Times compounded in a year
:CP
      : 9005
                9015
         Compounds per payment
:IC
      : 9000
                9015
         Interest rate/compounding period
:IP
      : 800
                820
                        9020
         Interest per payment
:IR
      : 775
                9000
        Annual interest rate
: N2
      : 770
                785
                        9005
         Number of payments per year
                795
: N3
      : 765
        Number of payments
: P#
      : 800
                805
                        820
                                825
        Total on deposit
:PQ
      : 760
                800
        Payment amount
      : 9015
:01
                9020
        Effective interest
: X
      : 795
                805
                        810
                                815
                                       9015
        Payment number
```

Annuity Due— Future Value (I,PMT,N = FV) Program

```
750 CLS:PRINTTAB(3)"FUTURE VALUE OF AN A
NNUITY DUE": REM A18
755 ' I.E. DEPOSITS MADE INTO A SAVINGS
ACCOUNT AT THE BEGINNING OF EACH MONTH
760 PRINT: INPUT"Enter amount of payments
":P0
765 INPUT"Total number of payments"; N3
770 INPUT"Number of payments per year":N
775 INPUT"Enter annual interest rate %";
IR
780 INPUT"Compounded how many times per
year";C
785 IF N2>C THENPRINT"You may not make m
ore than one deposit per interest compo
unding period.":GOSUB10000
790 GOSUB9000: FIND EFFECTIVE INTEREST
RATE PER PAYMENT
795 FOR X=1 TO N3
800 P#=P0+(P#+(P#*((IP)/100))): ' MOVE FW
D 1 PMT PERIOD
805 PRINTUSING"Payment ###. total on dep
osit$$#######":X:P#;
810 IF X/7 = INT(X/7)THENGOSUB10000:CLS
815 NEXT X
820 P#=P#+(P#*((IP)/100)): ' MOVE FWD LAS
T PMT PERIOD
825 PRINT"Final total": USING"$$#,######
.##":P#
830 GOSUB10000:RUN750
9000 IC=(IR/C)/100: 'INTEREST RATE PER CO
MPOUNDING PERIOD
9005 CP=C/N2: COMPOUNDS PER PAYMENT
9010 'FIND EFFECTIVE INTEREST RATE FOR C
2 PERIODS
9015 OV=1:FOR X=1 TO CP:QV=QV+(QV*IC):NE
9020 IP=(QV-1)*100: 'IP=INTEREST PER PAYM
ENT
```

9025 RETURN 10000 PRINT@281, "Press <ENTER> to contin ue, M for MENU"; 10005 A\$=INKEY\$:IFA\$="M"ORA\$="m"THENMAXF ILES=0:CLEARO:MENUELSEIFA\$<>CHR\$(13)THEN 10005ELSERETURN

ANNUITY DUE— PRESENT VALUE (I,PMT,N = PV)

This program calculates the present value (or *starting value*) of an annuity due, given the value of the payment itself. For example, if you sign a ten-year lease for a piece of equipment at \$250 per payment with an interest rate of 18 percent, then what is the present value of the annuity due (what would be an equivalent cash price for the equipment?)?

The program asks for the payment amount, the total number of payments, the number of payments made per year, the annual interest rate, and the number of times the balance is compounded per year. Only one payment is allowed per interest compounding period (or no payment at all in that period); that is, if the balance is compounded quarterly, the payments must be quarterly, semi-annual, or annual, and not monthly. This is obvious in that two payments within one compounding period aren't worth more than one sum payment in the same period. From this information the program calculates the present value of the annuity due.

Examples

Program	Your $response$
Enter amount of payments?	100
Total number of payments?	12
Number of payments per year?	12
Enter annual interest rate %?	12
Compounded how many times a year?	12
Value of annuity due: \$1,136.76	
Press <enter> to continue, M for Men</enter>	u
Enter amount of payments?	250
Total number of payments?	360
Number of payments per year?	12
Enter annual interest rate %?	18
Compounded how many times a year?	12
Value of annuity due: \$16,837.14	
Press <enter> to continue, M for Men</enter>	u

Line Number and Variable Cross-reference

```
Line Numbers
 Ref
:00900: 965
:09000: 940
:10000: 935
                965
                                9005
                        9000
      : 930
                935
: C
        Compounding periods per year
                9015
: CP
      : 9005
        Compounds per payment
                9015
      : 9000
:IC
        Interest rate/compound period
                9020
:IP
      : 950
         Interest per payment
                9000
      : 925
:IR
         Annual interest rate
                935
                        9005
      : 920
: N2
         Number of payments per year
                945
       : 915
: N3
         Number of payments
                 955
       : 950
: P#
         Annuity Due value
                        955
                950
      : 910
:PQ
         Payment amount
       : 9015
                 9020
:01
         Effective interest rate
                         9015
                 955
       : 945
: X
         Loop counter
```

Annuity Due— Present Value (I,PMT,N = PV) Program

```
900 CLS:PRINTTAB(5)"PRESENT VALUE OF AN
 ANNUITY DUE": REM A19
905 ' I.E. PAYMENTS MADE AT THE BEGINNIN
G OF EACH MONTH
910 INPUT"Enter amount of payments";PQ
915 INPUT"Total number of payments"; N3
920 INPUT"Number of payments per year"; N
925 INPUT"Enter annual interest rate %";
930 INPUT"Compounded how many times a ye
ar";C
935 IF N2>C THENPRINT"You may not make m
ore than one deposit
                       per interest compo
unding period.":GOSUB10000
940 GOSUB9000: FIND EFFECTIVE INTEREST
RATE PER PAYMENT
945 FOR X=N3-1TO 1 STEP -1
950 P#=(PQ+P#)/(1+(IP/100)): 'MOVE BACK O
NE PMT
955 NEXTX:P#=P#+P0
960 PRINT"Value of the annuity due: "; USI
NG"$$#_########":P#
965 GOSUB10000:RUN900
9000 IC=(IR/C)/100: 'INTEREST RATE PER CO
MPOUNDING PERIOD
9005 CP=C/N2: 'COMPOUNDS PER PAYMENT
9010 'FIND EFFECTIVE INTEREST RATE FOR C
2 PERIODS
9015 QV=1:FOR X=1 TO CP:QV=QV+(QV*IC):NE
9020 IP=(QV-1)*100: 'IP=INTEREST PER PAYM
ENT
9025 RETURN
10000 PRINT@281, "Press <ENTER> to contin
ue. M for MENU";
10005 A $ = I NKEY $ : I F A $ = "M" OR A $ = " m" THE NMAXF
ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
10005ELSERETURN
```

ANNUITY DUE—PAYMENT (PV,N,I=PMT)

If you are considering leasing a piece of equipment with a purchase price of \$1,000, and your intracompany cost of capital, or return on investment, is 18 percent per year, compounded monthly, what is the maximum you could afford to pay to lease the item?

The program takes the present value, total number of payments, number of payments per year, annual interest rate, and compounding period of the annuity due and calculates the payment.

Examples

Program	Your $response$
Enter present value of annuity?	1000
Total number of payments?	12
Number of payments per year?	12
Enter annual interest rate %?	18
Compounded how many times a year? Working	12
Payments would be \$90.33	
Press <enter> to continue, M for Menu</enter>	
Enter present value of annuity?	500
Total number of payments?	36
Number of payments per year?	12
Enter annual interest rate %?	6
Compounded how many times a year? Working	12
Payments would be \$15.14	
Press <enter> to continue, M for Menu</enter>	

Line Number and Variable Cross-reference

```
Ref
                               Line Numbers
:01000: 1100
:01055: 1080
                1085
:01095: 1075
:01100: 1090
:09000: 1045
:10000: 1100
      : 1030
: C
                9000
                        9005
        Compounding periods per year
:CP
      : 9005
                9020
        Compounding periods per payment
:IC
                9020
         Interest rate/compounding period
:IP
      : 1060
                9025
        Interest per payment
:IR
      : 1025
                9000
        Annual interest rate
: N2
      : 1020
                9005
        Number of payments per year
: N3
                1050
      : 1015
                        1055
        Total number of payments
: P#
      : 1060
                1070
                        1075
                                1080
                                       1085
        Miscellaneous variable
:PP
      : 1010
                1050
                        1075
                               1080
                                       1085
        Estimated payment
:PQ
      : 1050
                1060
                        1070
                                1080
                                       1085
        1095
        Trial payment
: QQ
      : 1040
                1080
                        1085
        Trial increment
: Q V
      : 9020
                9025
        Interest rate/compounding period
: X
      : 1055
                1065
                        9020
        Loop counter
```

Annuity Due—Payment (PV,N,I=PMT) Program

```
1000 CLS:PRINT"
                  PAYMENT FOR AN ANNUITY
 DUE": REM A20
1010 INPUT"Enter present value of annuit
y";PP
1015 INPUT"Total number of payments";N3
1020 INPUT"Number of payments per year";
N 2
1025 INPUT"Enter annual interest rate %"
: IR
1030 INPUT"Compounded how many times a y
ear";C
1035 PRINTTAB(15) "Working."
1040 \ 00=.1
1045 GOSUB9000: 'FIND EFFECTIVE INTEREST
 RATE PER PAYMENT
1050 PQ=PP/N3
1055 FOR X=N3-1TO 1 STEP -1
1060 P \# = (PQ + P \#) / (1 + (IP/100)) : MOVE BACK
ONE PMT
1065 NEXT X
1070 P#=P#+PQ
1075 IFINT(P#*100)=PP*100 THEN 1095
1080 IF P#<PP THEN PQ=PQ+(PQ*QQ):P#=0:GO
T01055
1085 IF P#>PP THEN QQ=QQ*.1:PQ=PQ-(PQ*(Q
0*10)):P#=0:GOTO 1055
1090 GOT01100
1095 PRINT@240, "Payments would be: "; USIN
G"$$#.######.##":PO
1100 GOSUB10000:RUN1000
9000 IC=(IR/C)/100: 'INTEREST RATE PER CO
MPOUNDING PERIOD
9005 CP=C/N2: COMPOUNDS PER PAYMENT
9010 'FIND EFFECTIVE INTEREST RATE FOR C
2 PERIODS
9015 QV=1:FOR X=1 TO CP:QV=QV+(QV*IC):NE
XT
9020 IP=(QV-1)*100: 'IP=INTEREST PER PAYM
ENT
9025 RETURN
```

10000 PRINT@281, "Press <ENTER> to continue, M for MENU";
10005 A\$=INKEY\$:IFA\$="M"ORA\$="m"THENMAXFILES=0:CLEARO:MENUELSEIFA\$<>CHR\$(13)THEN10005ELSERETURN

ANNUITY DUE— INTEREST RATE, PV KNOWN (PV,PMT,N = I)

This program will determine the interest rate being charged for an annuity due, given the amount of the payments, their total number, the number per year, and the annuity's present value. The only assumption is that the compounding period and the payment period are the same; that is, if the payment is monthly, then the compounding period is also monthly. Use the program Equivalent Interest—Comparing Compound Periods (presented earlier in this chapter) to calculate different compounding periods.

Another use for this program is in comparing an installment plan with a simple bank loan or even paying cash for the item.

For example, if you are being asked to pay \$15.14 per month on a three-year equipment lease, where the equipment has a purchase price of \$500, what interest rate are you being charged?

Examples

Program	Your response
Enter amount of payments? Total number of payments? Number of payments per year? Enter annuity present value? Interest rate is .52% per period, 6.24% per year. Press <enter> to continue, M for Menu</enter>	15.14 36 12 500
Enter amount of payments? Total number of payments? Number of payments per year? Enter annuity present value? Interest rate is 1.52% per period, 18.24% per year. Press <enter> to continue, M for Menu</enter>	90.33 12 12 1000

Line Number and Variable Cross-reference

```
Ref
                               Line Numbers
:01150: 1225
:01190: 1200
:01205: 1190
:01225: 1215
:01230: 1185
                1200
:10000: 1225
      : 1180
:IC
                1195
                        1205
                                1210
        Trial increment
:IP
      : 1180
                1195
                        1205
                                1210
                                       1215
         1220
                1235
        Interest rate per period
: N2
      : 1170
                1220
        Payments per year
: N3
      : 1165
                1230
        Total number of payments
: P#
      : 1180
                1190
                        1200
                                       1240
        Miscellaneous variable
: PQ
      : 1160
               1235
                        1240
        Amount of payments
:PV
      : 1175
                1190
        Present value
: T
      : 1180
                1205
        Loop counter
: X
      : 1230
                1240
        Loop counter
```

Annuity Due— Interest Rate, PV Known (PV,PMT,N = I) Program

```
INTEREST RATE FOR AN A
1150 CLS:PRINT"
NNUITIY DUE": REM A21
1160 INPUT"Enter amount of payments";PQ
1165 INPUT"Total number of payments"; N3
1170 INPUT"Number of payments per year";
N 2
1175 INPUT"Enter annuity present value";
1180 IP=0:IC=1:FORT=1 TO 3:P#=1
1185 GOSUB1230
1190 IFP#<PV THEN 1205
1195 IP=IP+IC
1200 P#=1:GOSUB 1230:GOTO 1190
1205 IP=IP-IC:IC=IC/10:NEXT T
1210 IC=IC*10:IP=IP+IC
1215 IF IP<0 THEN PRINT"DATA ERROR. PLEA
SE CHECK YOUR VALUES": GOTO1225
1220 PRINT"Interest rate is"; IP; "% per p
eriod, ":PRINTUSING"###.##"; IP*N2; :PRINT
"% per year."
1225 GOSUB10000:RUN1150
1230 FOR X=N3-1TO 1 STEP -1
1235 P#=(PQ+P#)/(1+(IP/100)): 'MOVE BACK
ONE PMT
1240 NEXTX: P#= P#+PQ
1245 RETURN
10000 PRINT@281, "Press <ENTER> to contin
ue, M for MENU";
 10005 A $ = I NKE Y $ : I F A $ = "M"OR A $ = "m"THE NMAXF
 ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
 10005ELSERETURN
```

ANNUITY DUE— INTEREST RATE, FV KNOWN (FV,PMT,N = I)

If you know the future value of an annuity due, as well as the payment amount, number of payments, and number per year, this program will tell you the interest rate.

Examples

Program	Your $response$
Enter amount of payments?	471.79
Total number of payments?	120
Number of payments per year? Enter the future value of the	12
annuity? Interest rate is .80% per period,	95000
9.60% per year, compounded 12 times a year.	
Press <enter> to continue, M for Menu</enter>	
Enter amount of payments?	37.07
Total number of payments?	24
Number of payments per year? Enter the future value of the	12
annuity?	1000
Interest rate is .92% per period,	
11.04% per year, compounded 12 times a	
year. Progg / FM/TED 1	
Press <enter> to continue, M for Menu</enter>	

Line Number and Variable Cross-reference

```
Line Numbers
 Ref
:02400: 2475
:02440: 2450
:02455: 2440
:02475: 2465
                2450
:02480: 2435
:10000: 2475
                2440
      : 2425
        Future value
                               2460
                        2455
                2445
:IC
      : 2430
        IP calculation variable
                                       2465
                        2455
                               2460
                2445
       : 2430
:IP
                        2495
         2470
                2485
        Interest rate/compounding period
                2470
: N2
       : 2420
         Payments per year
                2480
       : 2415
: N3
         Total number of payments
                                       2495
                                2485
                2440 2450
       : 2430
:P#
         Trial principal value
       : 2410
                2485
: PQ
         Payment amount
       : 2430
                 2455
: T
         Loop counter
       : 2480
                 2490
: X
         Loop counter
```

Annuity Due— Interest Rate, FV Known (FV,PMT,N = I) Program

```
2400 CLS:PRINT" INTEREST RATE OF AN AN
NUITY DUE": REM A22
2405 PRINTTAB(10)"FUTURE VALUE GIVEN
2410 INPUT"Enter amount of payments";PQ
2415 INPUT"Total number of payments"; N3
2420 INPUT"Number of payments per year";
N 2
2425 INPUT"Enter the future value of the
 annuity";FV
2430 IP=0:IC=1:FORT=1 TO 3:P#=1
2435 GOSUB2480
2440 IFP#>FV THEN 2455
2445 IP=IP+IC
2450 P#=1:GOSUB 2480:GOTO 2440
2455 IP=IP-IC:IC=IC/10:NEXT T
2460 IC=IC*10:IP=IP+IC
2465 IF IP<0 THEN PRINT"DATA ERROR. PLEA
SE CHECK YOUR VALUES":GOTO2475
2470 CLS:PRINT"Interest rate is:":PRINTU
SING"###.##% per period, ###.##% per yea
     compounded ### times a year."; IP; IP
*N2:N2
2475 GOSUB10000:RUN2400
2480 FOR X=1 TO N3
2485 P#=PQ+(P#+(P#*((IP)/100)))
2490 NEXT X
2495 P#=P#+(P#*((IP)/100)):RETURN
10000 PRINT@281, "Press <ENTER> to contin
ue. M for MENU";
10005 A$=INKEY$:IFA$="M"ORA$="m"THENMAXF
ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
10005ELSERETURN
```

Programming Utilities

The next two programs are the only ones that don't follow the numerical sequence order of the rest of the programs in this book: they both start with line number 10. This is because they are intended as programming aids, to be used independently.

The first program simply scans an ASCII-saved (.DO file) program and removes the unnecessary REM statements, freeing up valuable RAM for other programs and files.

You can use the second program to remove unneeded programs and files, without having to type KILL"filename" several times when you want to make more room available in your computer.

PACKER

The programs in this book, and many of the commercially available programs, have *REM statements* (remarks) in them. These statements are not used by the computer but are for the purpose of helping the programmer understand the inner workings of the program.

For example, in the program PACKER, there are a number of sentences that are preceded by the apostrophe ('). This symbol, which has the same effect as the word REM, tells the computer to ignore all that follows on that line. These sentences, however, will be valuable to you if you want to know how the program works or want to make changes in the program.

Space, though, is at a premium in the Model 100 computer. You may want to save space by deleting all unnecessary spaces, tabs, and REM statements. This can be done automatically by this program, PACKER.

To use PACKER, type it in as shown (you do not need to type in the apostrophes or the text that follows them). Save the program by typing SAVE"PACKER".

Now load in the BASIC program you wish to pack. Save that program in ASCII (.DO) format. If the program name is TEST1.BA, then save it by typing SAVE"TEST1.DO".

Now load and run PACKER. It will ask for the source program; type it in (for example, TEST1).

Then the program will ask for the name of the file you wish to create. Type in a different filename. The .DO at the end of the filename is optional. The program will add it if you omit it.

PACKER now starts reading your source program and printing the text on the new, shorter program that it is creating. When the new program is complete, PACKER will let you know how much memory it released from the source program.

PACKER will make the following changes to your programs:

1. All unnecessary spaces will be deleted. This line:

10 FOR X = 1 TO 10 : PRINT "HI THERE"

will be modified to read:

10 FORX=1TO10:?"HI THERE"

2. Tabs, if any, will be deleted.

- 3. Text preceded by an apostrophe will be deleted.
- 4. Text preceded by REM or rem will be deleted.
- 5. Any and all text enclosed in quotes will not be changed. The program line:

10 PRINT"This is not a REM statement because it is enclosed in quotes"

will not be changed in any way.

6. If a line contains only a REM statement, the entire contents of the line will be replaced by an apostrophe. For instance:

10 REM This is a remark

will be modified to read:

10'

The line that had the REM statement on it will not be deleted, so that, if the line is referred to in a GOTO, GOSUB, IF . . . THEN, or ELSE statement, the program will not crash.

Line Number and Variable Cross-reference

```
Ref
                                Line Numbers
:00010: 185
:00030: 220
:00070: 80
                 85
:00085: 105
                 120
                         135
                                 140
:00090: 80
                 95
                         130
:00110: 80
                 120
:00125: 80
:00140: 80
:00145: 25
:00190: 145
:00215: 195
                 200
:00220: 35
                 50
:10000: 185
: A$
       : 215
         Keyboard input
:FN$
       : 30
                 45
                       220
         Filename
:I$(
       : 125
                 135
         Previous input character
:12$
                 75
         Characters to be deleted
:IN$
      : 70
                 75
                        85
                                90
                                        95
        100
                 110
                        115
                                120
                                        125
        130
        File input
:LN
      : 65
                85
                        100
                                105
                                        110
        135
                140
        Line length control
: R $
      : 220
        Used in filename formatting
: X
      : 75
        INSTR variable
: Y
      : 85
                105
                        110
                                135
                                        170
        180
        Compressed length
              90
                                165
                                        180
        Original length
```

PACKER Program

```
10 CLS:PRINTTAB(15)"PACKER":REM PACKER
15 PRINT"****** Current files in memory
****** : FILES
20 MAXFILES=2
25 ONERRORGOTO145
30 INPUT"Enter .DO file to pack"; FN$
35 GOSUB220
40 OPEN FN$ FOR INPUT AS 1
45 INPUT"Enter .DO file to create";FN$
50 GOSUB 220
55 OPEN FN$ FOR OUTPUT AS2
60 I2$=CHR$(9)+" '"+CHR$(34)+"Rr"+CHR$(1
3):' <tab><space><apost><"><R><r><CR>
65 LN=0
70 IN$=INPUT$(1,1):Z=Z+1:'
   get chr from source
75 X=INSTR(1,I2$,IN$):'
   check for one of the characters
80 ON X GOTO 70,70,90,110,125,125,140:'
if <tab>or<space>, pass (goto 90)
85 PRINT#2,IN$;:PRINTIN$;:LN=LN+1:Y=Y+1:
GOTO70: Character is O.K. put in new fi
1e
90 IN$=INPUT$(1,1):Z=Z+1:' Chr is <apost
>, get next chr til CR
95 IFIN$<>CHR$(13)THEN90:'
  keep ignoring until end of line
100 IF LN<7 THEN IN$="'"+IN$:'
    if possible line number only...
105 Y=Y+1:LN=0:GOT085:'
   print the CR (goto 120)
110 PRINT#2, IN$;:PRINTIN$;:LN=LN+1:Y=Y+1
    Character is a <">, print it
115 IN$=INPUT$(1,1):Z=Z+1:'
    get next character
120 IF IN$=CHR$(34)THEN85ELSE110:'
   keep reading & printing until <">
125 \text{ I} (1) = \text{IN}: \text{IN} = \text{INPUT} (2, 1)
130 IF IN$="EM"ORIN$="em"THEN90:'
   Chrs are REM, keep going til CR
135 PRINT#2, I$(1); :PRINTI$(1); :LN=LN+1:Y
= Y + 2 : GOTO85 : '
nt the R, next 2, and the rest
                              end of line
140 LN=0:GOTO 85:'
```

```
145 IF ERR<>54 THEN 190
150 CLOSE
155 CLS
160 PRINT
165 PRINT"Program Length was"; Z
170 PRINT"Program is now
175 PRINT
180 PRINT"Your savings
                            "; Z-Y
185 GOSUB10000: RUN10
190 CLOSE
195 IF ERR=52 THEN PRINTFN$;" Not found"
:GOT0215
200 IF ERR=53 THENPRINT"Source and desti
nation files must have different names"
:GOT0215
205 ON ERROR GOTO O
210 RESUME
215 INPUT"Press Enter"; A$:RUN
220 R$=RIGHT$(FN$,3):IF(R$<>".DO"AND R$<
>".do")THENIF LEFT$(R$,1)<>"."THENFN$=FN
$+".do"ELSEBEEP:PRINT"Invalid Filename :
":PRINTFN$:PRINT"Please Re-enter":GOTO 3
0
225 RETURN
10000 PRINT@281, "Press <ENTER> to contin
ue, M for MENU";
10005 A$=INKEY$:IFA$="M"ORA$="m"THENMAXF
ILES=0:CLEARO:MENUELSEIFA$<>CHR$(13)THEN
10005ELSERETURN
```

PURGER

This program utility makes it simpler to remove unwanted files from the Model 100 memory. When the program starts, a list of all the current files in memory is displayed. Below them is printed the prompt Kill? Type the name of the file you want deleted, in uppercase letters. Give the full name, including the designation of file type (.BA, .DO, or .CO). If you begin to type in lowercase, a message will appear telling you to press the CAPS LOCK key.

Each time a file is deleted, the program relists all the current files so you can see which ones are left. If you delete a BASIC file, the prompt $Press\ F4$ to continue. appears. This is because normal program execution is halted whenever a BASIC program is removed from the directory, and you must rerun the PURGER program to continue. F4 does this for you.

When you're finished, or if you have decided against deleting any programs, press the F8 key, and you'll be returned to the

Model 100 menu.

Line Number and Variable Cross-reference

```
Ref
                               Line Numbers
:00010: 90
:00040: 60
:00045: 100
:00050: 50
:00095: 15
:00105: 95
:1$
      : 50
                60
                        65
                                75
        Letter input
: X $
      : 70
                        80
                                85
        Filename
:X1$
      : 80
        File type
```

PURGER Program

```
10 CLS:CLEAR256:PRINTTAB(15)"PURGER":REM
Purger
15 ON ERROR GOTO 95
20 KEY4, "Run"+CHR$(13)
25 ONKEYGOSUBO, 0, 0, 0, 0, 0, 0, 110
30 KEY OFF: KEY(8)ON
35 FILES
40 PRINT@315, "Quit";
45 PRINT@240, "Kill ? ";
50 I$=INKEY$:IFI$=""THEN50
55 PRINT@280."
                                  ";:PRIN
T@247."":
60 IFI$>="a"ANDI$<="z"THENPRINT@280,"Hit
 <CAPS LOCK>"::GOTO40
65 PRINTIS:
70 LINEINPUT X$
75 X$=I$+X$
80 X1$=RIGHT$(X$,3):IFX1$=".BA"THENCLS:P
RINT:PRINT:PRINT"Press <F4> to continue.
85 KILL X$
90 RUN10
95 IFERR<>52ANDERR<>55THEN105
100 BEEP:PRINT@280, "File not found"; :PRI
NT@247,"
                   ";:RESUME 45
105 ON ERROR GOTO O:RESUME
110 MAXFILES=0:CLEARO:MENU
```

Select Bibliography

References we used in writing this book include:

- Boone, Louis E., and David L. Kurtz. Contemporary Marketing. 3rd ed. Hinsdale, Ill.: Dryden Press, 1980.
- Pyle, William W., John Arch White, and Kermit D. Larson. Fundamental Accounting Principals. 8th ed. Homewood, Ill.: Richard D. Irwin, Inc., 1978.
- Texas Instruments Learning Center. Calculator Analysis for Business and Finance. Texas Instruments Inc., 1977.
- Weston, J. Fred, and Eugene F. Brigham. Essentials of Managerial Finance. 5th ed. Hinsdale, Ill.: Dryden Press, 1979.

Glossary

- Add-on interest. A form of simple interest as it applies to loan repayment. The stated interest rate is multiplied by the total amount of the loan each year.
- Amortize. To liquidate on an installment basis. An amortized loan is one in which the principal amount of the loan is repaid in installments during the life of the loan.
- **Annuity.** A series of payments of a fixed amount for a specified number of time periods.
- Annuity due. An annuity for which payments are made at the beginning of each period. A common example of such a payment is a lease payment. See Ordinary annuity.
- **Apostrophe** ('). A BASIC statement meaning *remark*. All information that follows the apostrophe on that program line is ignored by the computer. *See* REM.
- Average collection period ratio. Receivables divided by sales per day. This ratio can evaluate your collections department and sales terms.
- Balloon payment. The final payment, larger than preceding payments, made on a loan or debt that is not fully amortized.

- Book value. The accounting value of an asset.
- Calculation variable. A program variable that is used to hold the products of calculations. It does not necessarily represent a specific item such as useful life or present value.
- CLEAR. A Model 100 BASIC command that erases unnecessary information from previous programs.
- Compound interest. An interest rate that is applied to the sum of original principal plus interest previously earned.
- Continuous compounding. The applying of interest at every point in time rather than at certain points in time (monthly or yearly, for instance). If continuous compounding applies, your money is growing every minute, every second, of every day.
- Current ratio. Current assets divided by current liabilities. This is a common measure of short-term solvency.
- **Debt ratio.** Total debt divided by total assets.
- **Debt-to-total-assets ratio.** Total debt divided by total assets. This measures how much of the firm's value is provided by creditors.
- Economic order quantity (EOQ). The optimum size of a merchandise order, calculated so that inventory is neither held too long nor ever out of stock.
- Effective interest rate. The interest rate used in computation or evaluation. See Nominal interest rate.
- Fixed asset turnover ratio. Sales divided by fixed assets. This ratio can indicate whether the firm is using its plant and equipment to their maximum capacity.
- Fixed charge coverage ratio. Income available for meeting fixed charges, divided by fixed charges. This ratio can help determine the overall stability of the company and takes the widespread use of leasing into account.
- **Fixed charges.** Costs that do not vary with level of output. For example, the lease costs of a manufacturing plant are the same regardless of whether

- the plant is producing at full capacity or half capacity. See also Variable costs.
- Future value. The amount that a payment will be worth in the future after interest is calculated. See Present value.
- Income available for meeting fixed charges. The sum of profit before taxes, interest charges, and lease obligations.
- Installment plan. Often called *revolving charge plan*, this is the type of loan repayment program that charges interest on the unpaid balance. Most credit cards use this type of interest.
- Internal rate of return. The rate of return on an asset investment. The internal rate of return is calculated by finding the discount rate that equates the present value of future cash flows to the cost of the investment.
- Inventory turnover ratio. Sales divided by inventory. This ratio can indicate whether a firm is overstocking or understocking merchandise.
- **Lifespan.** Also called *useful life*, or simply *life*, of an asset, this is the length of time for which the asset is assumed to be productive. If a machine is expected to last five years, its lifespan is said to be five years. Note that this is an accounting value, not necessarily a realistic value. The life of all items is estimated for the purpose of depreciation.
- Loop counter. A program variable used to hold the number of times that the program flow has passed a certain point in the program.
- MAXFILES. A Model 100 BASIC command that specifies the number of input and output files you will be using. The command also erases unneeded information from previous programs.
- **Menu program.** A program, or part of a program, that coordinates different or related programs or subprograms. A menu program allows the user to choose which program or function to use.
- MERGE. A Model 100 BASIC function that allows you to combine an ASCII-saved file (one with a filename ending in .DO) with a BASIC program while it's in BASIC.

Miscellaneous variable. A program variable that is used to hold the products of calculations. It does not necessarily represent a specific item such as *useful life* or *present value*.

Net worth. The capital and surplus of a firm; the common shareholder's position.

Nominal interest rate. The contracted or stated interest rate. See Effective interest rate.

Ordinary annuity. An annuity for which payments are made at the end of each period. Common examples of such payments are loan payments and revolving charges. *See* Annuity due.

Periodic compounding rate. An interest rate that is continuously compounded.

Present value. The value today of a payment to be made in the future after interest is calculated. See Future value.

Prime rate. The lowest rate of interest that commercial banks will charge to supposedly risk-free customers.

Profit margin. The ratio of a firm's after-tax profits to its sales.

Profit margin on sales ratio. Net profit after taxes, divided by sales. This measures the profit, per dollar, of the sales.

Program gap. The shortage of programs to fill the needs of businesspeople and the capabilities of their computers.

Quick ratio. Also called the *acid test*. The difference between current assets and inventory, divided by current liabilities. This measures the ability of a firm to pay off its debt without the help of its inventory. This might be the case in the event of bankruptcy.

REM. A BASIC statement meaning *remark*. All information that follows the word REM on the program line is ignored by the computer. *See* Apostrophe (').

Required rate of return. The rate of return that stockholders expect to receive on common stock investments.

Return on net worth. Net profit after taxes, divided by net worth. This measures the rate of return on the stockholder's investment.

- Return on total assets ratio. Net profit after taxes, divided by total assets. This measures the return on the total investment, or ROI, of the firm.
- Salvage value. The value of a capital asset at the end of a specified period. This is the cost at which an asset will be sold when the firm is finished with it. It is used in depreciation calculations.
- **Standard deviation.** A statistical measurement of the variability of a set of observations from the mean value of the distribution.
- Subroutine. A smaller program that is used by a larger program. If, for example, your main program often needs to calculate the number of days between two dates, a separate program calculating days between dates is written so that it can be called several times by the main program.
- Times interest earned ratio. The sum of profit before taxes and interest charges, divided by interest charges. This ratio measures the ability of a firm to withstand a sales slump.
- Total asset turnover ratio. Sales divided by total assets. This relates the volume of business to the asset investment.
- Variable costs. Costs that increase according to increases in production. These include materials and maintenance. See also Fixed charges.
- Weighted average. An average that is based on some factor in the items being averaged. Using a weighted average system, some items being averaged have more importance, or weight, than others.
- Working capital. A firm's investment in short-term assets such as cash, short-term securities, accounts receivable, and inventories. Gross working capital is the total current assets. Net working capital is the current assets minus current liabilities.
- Yield. The rate of return on an investment. See Internal rate of return.

İ		
	the first of the second state of the second st	

Index

A\$, xii Accountant's helpers, 141 Adding, xi Add-on interest, 267 Add-on interest, converting, to annual interest, 79 Algebraic calculators, 20 Amortization, 158, 267 Analysis, breakeven unit, 30 Annual interest, converting to, from add-on interest, 79 Annuity due, 201, 267 Annuity due, finding future value of, 237 Annuity due, finding interest rate of, from future value, 252 Annuity due, finding interest rate of, from present value, 249 Annuity due, finding payment of, from present value, 245 Annuity due, finding present value of, 242 Annuity, ordinary, 201, 267, 270 Annuity, ordinary, finding future value of. 202 Annuity, ordinary, finding future value of, with continuous

compounding of interest, from

payment, 208

Annuity, ordinary, finding future value of, with continuous compounding of interest, from present value, 205 Annuity, ordinary, finding interest rate of, from future value, 227 Annuity, ordinary, finding interest rate of, from present value, 230 Annuity, ordinary, finding number of payments of, 233 Annuity, ordinary, finding payment of, from future value, Annuity, ordinary, finding payment of, from present value, 220 Annuity, ordinary, finding present value of, 211 Annuity, ordinary, finding present value of, with continuous compounding of interest, from future value, 217 Annuity, ordinary, finding present value of, with continuous compounding of interest, from payment, 214 Apostrophe, x, 267, 270

Asset turnover ratio, fixed, 2, 268 Asset turnover ratio, total, 2, 271 Average collection period ratio, 2, 267 Average, weighted, 168, 271 Average yield of an investment, 164

Balance unpaid, 92
Balloon payment, 267
Bar chart, 133
Book value, 268
Borrowing money, 76
Breakeven unit analysis, 30

Calculation variable, 268 Calculator program, 20 Calendar, 58 Capital asset pricing model, 96 Capital, working, 271 Cash management model, 100 Charge coverage ratio, fixed, 2, 268 Charges, fixed, 3, 268 Chart, bar, 133 Chart, pie, 125 CLEAR, ix, 268 Collection period ratio, average. Comparing compound periods, 197 Compounding, continuous, 268 Compounding rate, periodic, 270 Compound interest, 268 Compound interest computations, 185 Compound interest, finding future value of, 181 Compound interest, finding interest rate of, 194 Compound interest, finding present value of, 190 Compound interest, finding time period of, 186 Compressing, xi, xii Continuous compounding, 268 Converting add-on interest to annual interest, 79

Cost before markup, 110

Costs, variable, 2, 269, 271

Costs, fixed. See Charges, fixed

Counter, loop, 269 Credit, easy, 71 Credit plan, 71 Cross-reference, xi Current ratio, 2, 268

Days between dates, 62, 168 Debt-to-total-assets ratio, 2, 268 Decision making, management, 65 Declining-balance depreciation, Declining-balance versus straight-line depreciation, 155 Deleting, xi Depreciation, 142 Depreciation, declining-balance, Depreciation, straight-line, 143 Depreciation, straight-line versus declining-balance, 155 Depreciation, sum-of-year'sdigits, 146 Deviation, standard, 271 Direct statement in file, x Discounted price, 116 Discount, price before, 119 Dividends, 164

Earnings per share, 168
Easy credit, 71
Economic order quantity, 13, 268
Effective interest rate, 268, 270
EOQ. See Economic order
quantity
Equivalent interest: comparing
compound periods, 197

Fixed asset turnover ratio, 2, 268 Fixed charge coverage ratio, 2, 268 Fixed charges, 2, 269, 271 Fixed costs. See Fixed charges Future value, 269, 270

Glossary, 267

Income available for meeting fixed charges, 269 Installment plan, 92, 269 Installment plan schedule, 92

Insurance, term versus whole life. Interest, add-on, 267 Interest: comparing compound periods, 197 Interest, compound, 268 Interest, compound, finding future value of, 181 Interest, compound, finding interest of, 194 Interest, compound, finding present value of, 190 Interest, compound, finding time period of, 186 Interest computations, compound, Interest rate, effective, 268, 270 Interest rate, nominal, 268, 270 Interest, simple, finding future value of, 177 Interest, total, paid on a loan, 76 Internal rate of return, 269, 271 Inventory turnover ratio, 2, 269 Investment, average yield of, 164 Invoice program, 36

Job quote, 49

Lease versus purchase, 86 Life. See Lifespan Lifespan, 142, 269 Linear calculators, 20 Loan repayment and rebate, 82 Loan, total interest paid on, 76 Loop counter, 269

Management decision making, 65
Management model, cash, 100
Margin, profit, 122, 270
Markup, 107
Markup, cost before, 110
Markup, percentage, 113
MAXFILES, ix, 269
Maximum line length, xii
Menu program, viii, 269
MERGE, viii, 269
Miscellaneous variable, 270
Model, cash management, 100
Money, borrowing, 76

Net worth, 2, 270 Net worth, return on, 2, 270 Nominal interest rate, 268, 270

Order quantity, economic, 130 Ordinary annuity, 201, 267, 270 Ordinary annuity, finding future value of, 202

Ordinary annuity, finding future value of, with continuous compounding of interest, from payment, 208

Ordinary annuity, finding future value of, with continuous compounding of interest, from present value, 205

Ordinary annuity, finding interest rate of, from future value, 227

Ordinary annuity, finding interest rate of, from present value, 230

Ordinary annuity, finding number of payments of, 233

Ordinary annuity, finding payment of, from future value, 224

Ordinary annuity, finding payment of, from present value, 220

Ordinary annuity, finding present value of, 211

Ordinary annuity, finding present value of, with continuous compounding of interest, from future value, 217

Ordinary annuity, finding present value of, with continuous compounding of interest, from payment, 214

PACKER, 256
Payment, balloon, 267
Percentage markup, 113
Period, average collection, ratio, 2, 267
Periodic compounding rate, 270
Pie chart, 125
Plan, installment, 269
Present value, 269, 270

Price before discount, 119
Price before sales tax, 104
Price, discounted, 116
Pricing model, capital asset, 96
Prime rate, 270
Profit margin, 122, 270
Profit margin on sales ratio, 2, 270
Program gap, iii, 270
Purchase versus lease, 86
Purchase versus time payment, 71
PURGER, 261

Quick ratio, 2, 270 Quote, job, 49

Rate, internal return, 271 Rate of return, 164 Rate of return, required, 270 Rate, prime, 270 Ratio, current, 2, 268 Ratio, debt-to-total-assets, 2, 268 Ratio, fixed asset turnover, 2, 268 Ratio, fixed charge coverage, 2, 268 Ratio, inventory turnover, 2, 269 Ratio, profit margin on sales, 2, Ratio, quick, 2, 270 Ratio, return on total assets, 2, 271 Ratios, 2 Ratio, times interest earned, 2, Ratio, total asset turnover, 2, 271 Rebate and loan repayment, 82 REM, x, 267, 270 Required rate of return, 270 Return on net worth, 2, 270 Return on total assets ratio, 2, 271 Return rate, internal, 271

Sales ratio, profit margin on, 2, 270 Sales tax, price before, 104 Salvage value, 271
Shares outstanding, 168
Simple interest, finding future
value of, 177
Standard deviation, 271
Stock share earnings, weighted
average, 168
Straight-line depreciation, 143
Straight-line versus decliningbalance depreciation, 155
Subroutine, 62, 168, 271
Sum-of-year's-digits depreciation,
146

Term versus whole life insurance, 66
Time payment versus purchase, 71
Times interest earned ratio, 2, 271
Total asset turnover ratio, 2, 271

UL error, xi Unpaid balance, 92 Useful life, 269 Using this book, viii

Value, book, 268 Value, future, 269, 270 Value, present, 269, 270 Value, salvage, 271 Variable, calculation, 268 Variable costs, 2, 269, 270 Variable, miscellaneous, 270 Variables, xi

WAIT, ix
Weighted average, 168, 271
Weighted average number of
stock shares outstanding, 168
Whole versus term life insurance,
66
Working capital, 271

Yield, 271 Yield rate, 164

6 BUSINESS APPLICATIONS PROGRAMS

FOR THE TRS-80 MODEL 100 COMPUTER

When you own a computer as powerful as the TRS-80 Model 100—InfoWorld's Hardware Product of the Year for 1983—you need programs that will make the most of it. This book gives you 60 programs you can put to work immediately in your business and in your personal financial planning.

Designed by a businessperson and a professional writerprogrammer, these programs quickly perform a wide variety of useful business calculations. Use this book to

- calculate 12 business analysis ratios
- calculate breakeven sales levels
- create and print invoices
- calculate depreciation and amortization
- find the average yield of your investments
- create bar and pie charts

and much more!

This book couldn't be easier to use—just type in the programs you need. All programs are fully explained, and you'll see each program listing exactly as it will appear on your computer screen.

Turn your Model 100 into a valuable business tool with 60 BUSINESS APPLICATIONS PROGRAMS FOR THE TRS-80 MODEL 100 COMPUTER.

Terry Kepner is a professional writer and programmer. He currently writes monthly columns for 80 Microcomputing, and Portable 100 Magazine, and reviews hardware and software for Byte, Popular Computing, Microcomputing, Hot Coco, and others.

Mark Robinson works for RAMparts Publishing, a company that owns and markets numerous computer mailing lists. He previously was president of Interpro Corporation, which published software for the TRS-80 Models I and III, and served as a computer consultant to businesses.